AMERICAN ARTISAN

MARCH
1941

RESIDENTIAL AIR CONDITIONING
ARM AIR HEATING • SHEET METAL CONTRACTING

ESTABLISHED
1880

HERE ARE 4 BIG LAMNECK FEATURES *Working for YOU*

Users of LAMNECK Prefabricated Duct and Fittings are not only keeping pace with today's increased [illegible] but are doing it with four big LAMNECK features working for them in meeting the demands of the National Defense Housing Program. With LAMNECK they are doing their share in this Program and still retaining their regular work. SO CAN YOU.

● Let LAMNECK Prefabricated Duct and Fittings add extra volume to your shop and machinery. Eliminate your shop bottle-neck. Pick up the phone and order all the fittings you need for today's installation from your nearest LAMNECK Distributor.

● Multiply your present man-power's effectiveness by using LAMNECK Fittings on every job. Handle today's record business in your stride and on schedule by directing all your efforts to installation work. Use the factory-backed stock of your LAMNECK Distributor as your fittings shop.

● LAMNECK will expand your capital and turn it over faster. Broaden your capital limitations by lessening the time between your expenditures for material and the day you collect for the job. Buy LAMNECK Fittings as and when you are ready to install them.

● With LAMNECK you can aways figure your definite costs in advance . . . naturally then, you always know exactly where you stand. Avoid red ink . . . bid with confidence when you base your bid on LAMNECK.

WRITE US TODAY!
for the name of your nearest LAMNECK Distributor, who will clearly and concisely explain every detail.

Specify LAMNECK

LAMNECK PRODUCTS INC. Middletown, Ohi(

Simplified Furnace Pipe and Fittings and Prefabricated Duct and Fittings for all Types of Residential Gravity and Forced Warm Air Heating and Air Conditioning Systems.

• YOU HAVE THE OPPORTUNITY!

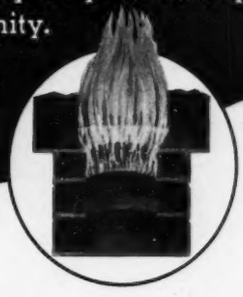
WHY NOT STEP AHEAD · · BE A SPECIALIST! SELL LOCHINVAR INSTEAD OF COAL SHOVEL SERVICE!

If LOCHINVAR'S efficient, economical, trouble-free performance was not an established fact, this thought would be out of place. But it is a fact . . . an amazing revelation of efficiency in small-home, low-cost, automatic heating service.

Why should you remain just another bidder in a hectic price-cutting, profit-shrinking, highly competitive field when, as a representative of LOCHINVAR Oil Heating Units you can show every prospect that your service will give him Automatic Heating *at a cost of but little more than the ordinary, old-fashioned hand-fired furnace.*

Write us today! Get out of the rut and start to really build an exclusive business that can make money for you, make you really successful! LOCHINVAR offers you that opportunity.

LOCHINVAR'S EXCLUSIVE



TWIN BAFFLE BURNER

Lochinvar's Exclusive Patented Burner has no Equal for Efficiency in Small Home Economy

Until LOCHINVAR was perfected, the high cost of all efficient Oil Burning Units made ninety-one per cent of American families shovel for their comfort. This vast market is now the LOCHINVAR market because LOCHINVAR Automatic Oil Heat and Air Conditioning Units are now produced within the price range of the small home owner. LOCHINVAR'S efficiency; LOCHINVAR'S perfected, trouble-free performance; LOCHINVAR'S low first cost and economical operating cost has made it the fastest selling Automatic Heating Unit in America today. Home owners buy it! You don't have to sell it. Just tell them the facts, show them the records, and the job is yours!

LOCHINVAR PRODUCTS

14247 Tireman Ave., Dearborn, Mich.

Makers of LOCHINVAR OIL HEATING UNITS FOR SMALLER HOMES

Also America's Fastest Selling Oil Burning Water Heater

AMERICAN ARTISAN

WITH WHICH ARE MERGED

FURNACES AND SHEET METALS

AND

Warm-Air Heating

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

J. D. Wilder, Editor — A. A. Kennedy, Assistant Editor

Vol. 110, No. 3 — March, 1941 — Founded 1880

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In This Issue

THIS month's front cover photograph shows an installation made by Suburban Air Conditioning Co. whose belief that profit on every job—not volume is the right policy is described on page 52.

●

Much conversation has been and is being bandied about regarding the purchase by the Procurement Division of furnaces in bulk quantities. Much of the conversation is pure gossip. The facts are presented by Arnold Kruckman in his Washington Letter, page 44.

●

With business good and money "in the pocket" many contractors are considering putting some of their profits back into better show rooms. The question is — "Will modernization pay?" The answer for a typical group of shops is given on page 88.

●

This March issue is unusually full of convention reports—Indiana, Wisconsin, Ohio—three good, well-attended, interesting conventions, each reflecting "good times," money in the bank, and good prospects for 1941. We are giving readers' a few more convention snapshots this year.

●

An article in the Air Conditioning Section — "Air Avidity" raises a new thought in humidification. There will be three articles in the series. This characteristic of air to take moisture from every available source accounts, we suspect, for numerous humidification problems. We invite readers to comment on this new thought and to offer actual proofs for or against.

●

Henry Aronson's series on the Technical Code — Precalculated is moving swiftly to an end. The chapter this month is especially important and the tables particularly time savers. If you have followed the series we shall be glad to have your comments.

Member of Audit Bureau of Circulations — Member Associated Business Papers, Inc.

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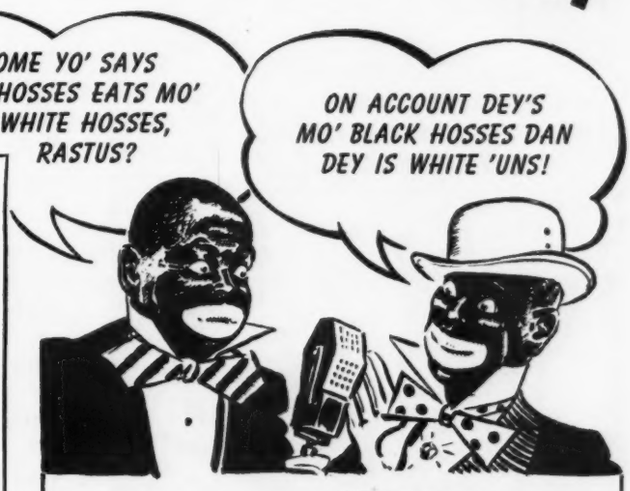
More than 8,000 copies of this issue are being distributed

"An' PEOPLE eat plenty, too!

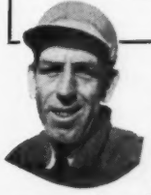
...that's why there's so many places where you can land orders for food service equipment!"



1 Yeah, Rastus, but do you know who eats more even than black hosses? *People!* An' in places like a soldier's home, *what* they eat an' how it's *served* is mighty important. So this electric heating oven made of #35 Monel was a push-over for some sheet metal man. No kicks about keeping *this* clean.

2 Every job you do in #35 Monel can be as swell looking as this outfit for sterilizing glasses. You don't have to spend a month polishin' #35 Monel by hand. Every sheet has the same smooth lustre, a standard finish put on at the mill. An' it costs nothin' extra . . . so that's still *more* gravy for you!

3 Any place where you can smell food or drink you're liable to turn up a job for Monel. Here's a guy in Cleveland puts a bar in his basement rumpus room! How does he make sure his friends won't burn or bust it? He has it made out of #35 Monel.



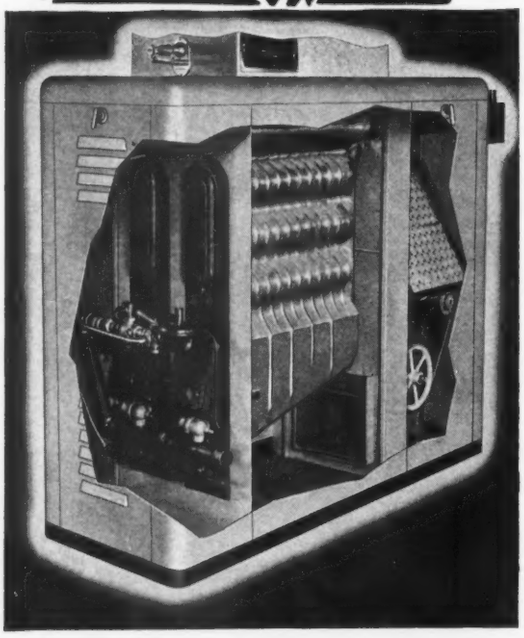
There's two reasons why #35 Monel is a cinch for food service equipment. The swell factory finish means it's no trouble at all to make every piece look identical. Also, #35 Monel is easy to work . . . which means bigger profits for you on every job.

Tim Shears

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street **New York, N. Y.**

RYBOLT

Two things you must do to sell AUTOMATIC HEATING



For Economical Automatic Gas Heating

For those customers who want the cleanliness, convenience and comfort of automatic gas heating, the RYBOLT Gasmaster has everything. Complete with automatic control, automatic humidifier, quiet running blower and specially designed burner with automatic shut-off the Gasmaster is a marvel of quiet, efficient and trouble-free performance. Compact, attractive in design and handsomely finished in smooth gray Hammerloid with black base. 5 sizes.

• It is estimated that 650,000 new homes are going to be built in the United States this year. This opens up a big potential market for automatic heating, and naturally you want to get your share of this desirable business. • To sell more automatic heating equipment there are two things you must do: *First,* tell home owners and builders that you have a complete line of RYBOLT Winter Air Conditioners for every type of home, fired by coal, gas or oil. *Second,* let them know that RYBOLT modern automatic heating units are not high-priced and can be bought on easy terms. A simple formula, *but it works.* Try it.

WRITE FOR *Folders describing and illustrating the Complete RYBOLT line of Furnaces and Winter Air Conditioners*

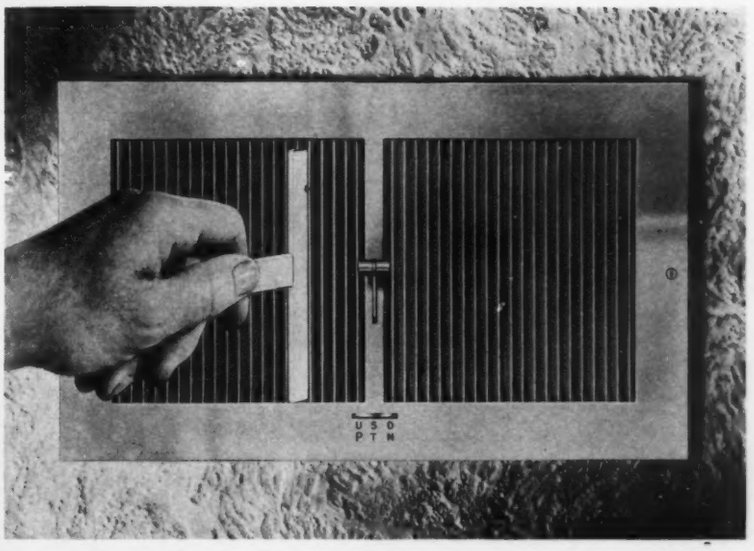
rh
TRADE MARK

THE RYBOLT HEATER COMPANY
615 MILLER STREET • ASHLAND, OHIO

FOR AIR CONDITIONING AT ITS VERY BEST

Use H&C No 75 Design
(NOT AN EXPENSIVE REGISTER)

Combines a flexible-fin type face and the incomparable H&C Turning Blade Valve. Provides positive control of the air flow in both a vertical and horizontal plane. BETTER RESULTS are thus assured than can be obtained with ANY register not having the Turning Blade Valve. With the latter turbulence is eliminated and hence RESISTANCE is actually less than if no register were used. Air flows with uniform velocity through each portion of the register face. Consequently distribution is more even, cold spots and "draft sensations" are eliminated and the customer obtains the maximum of comfort. That's what COUNTS! *For air conditioning at its very best,* try the No. 75 on your next job. It costs no more than multi-deflection registers employing the ordinary multi-shutter valve.



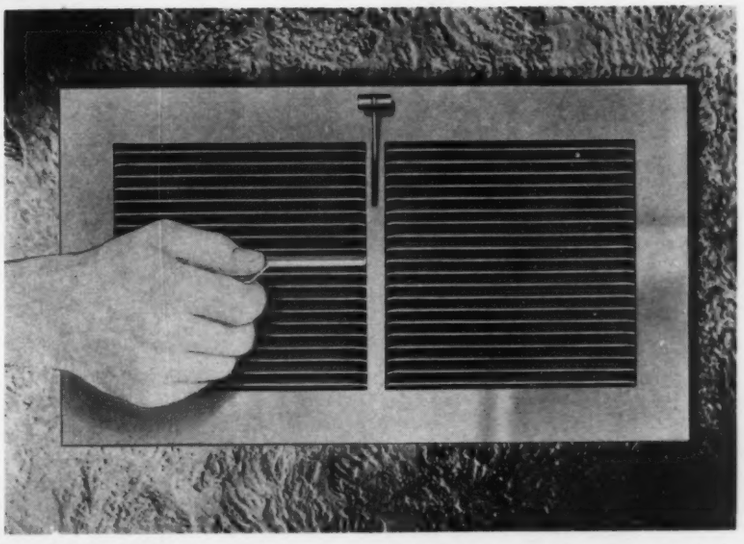
No. 751 REGISTER. Flexible-fin type. Equipped with the incomparable H&C Turning Blade Valve.

TO STEP UP THE EFFICIENCY OF YOUR LOW-PRICED INSTALLATIONS

Use H&C No 74 Design
(AN OUTSTANDING LOW COST REGISTER)

NOW IN PRODUCTION

Offers a splendid opportunity to obtain far better than average results from your low priced installations. Has a flexible-fin type face and is furnished with fins set for 20° downward deflection. When thus installed in high sidewall locations, it completely eliminates the possibility of streaked ceilings. Any upward or downward deflection, however, may be quickly secured by twisting the fins with the wrench furnished. Such control of the air flow naturally makes for better distribution and more uniform temperature than can be obtained with the ordinary non-directional register. Yet, the cost of the H&C No. 74 Design is so little more than the cheapest registers on the market as to be practically negligible. It's THE register to use when competition makes you count the pennies.



No. 741 REGISTER. Flexible-fin type equipped with positive action, single shutter valve.

Current Catalogs: No. 41 (Gravity Registers) and No. 41AC (Air Conditioning Registers). If not on hand, write us.

HART & COOLEY MANUFACTURING CO.

Warm Air Registers • Air Conditioning Grilles • Damper Regulator Sets • Dampers • Chain • Pulleys

HOLLAND H&C MICHIGAN

Chicago Office: 61 W. Kinzie St. Philadelphia Office: 1600 Arch St.

Western Representatives: John T. Rowntree Co., Los Angeles, San Francisco, Portland, Seattle, Salt Lake City, Denver

A MASS DRIVE TO SELL A

MINNEAPOLIS-HONEYWELL believes that the story of Automatic Heating should be told nationally as one of the major developments of modern times . . . told unselfishly and generally, so that all branches of our great Industry may benefit. As the leading manufacturer of heating controls, Minneapolis-Honeywell is in an ideal position to initiate such a mass selling drive, and offers this program as its contribution to "BETTER BUSINESS" in the "HEATING BUSINESS" in 1941.

The campaign will stress these important points:

1 • The tremendous improvement during recent years in all types of Automatic Heating.

2 • The low cost of installing Automatic Heating.

3 • The easy terms available under FHA and through other sources for financing its purchase.

There will be twenty-seven hundred and ninety-six Billboard Postings in 387 heating markets throughout the year, twenty-seven striking advertisements in color in six great national magazines—Saturday Evening Post, Life, House & Garden, House Beautiful, American Home, Better Homes and Gardens—a total of over 37,500,000 magazine messages selling Automatic Heating.

There will be folders in color, newspaper advertisements, display pieces, wall and window hangers, radio copy, for your use in tying up with this great drive—all free. Each month the publication "Temperature Times" will bring you and 25,000 other men in the Industry a play-by-play report on the progress of this Campaign.

It is to the interest of every manufacturer, jobber, and dealer in the Industry to tie up with this great effort, designed to make the public aware of the advantages and the low cost of Automatic Heating.

■ ■ ■

It's YOUR SHOW *from Start to Finish*

• Let's put it over. Get your share of America's increasing income. And let's make 1941 the biggest year in the history of Automatic Heating.

• If you are not receiving "Temperature Times," the monthly newspaper devoted to facts about your problems and this Campaign—mail the coupon on the opposite page. It's yours for the asking.

Sponsored by **MINNEAPOLIS H**

AUTOMATIC HEATING *in* 1941

37,500,000

MAGAZINE MESSAGES *and* **BILLBOARDS FROM COAST *to* COAST**

Temperature Times
A GREAT CAMPAIGN TO SELL AUTOMATIC HEATING IN 1941
Sponsored by Minneapolis-Honeywell
"A SWEETHEART"
FULL DETAILS OF YEAR ROUND EFFORT ON PAGE 2
Beauty WITH THE HEATING BLUES
Today's AUTOMATIC HEATING
AND MINNEAPOLIS-HONEYWELL Controls
including Chronotherm

S HONEYWELL
REGULATOR CO.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY
2801 Fourth Avenue South, Minneapolis, Minnesota
I would like to receive "Temperature Times" free each month

Name .....
Company Name .....
Product Sold ..... State .....
City .....

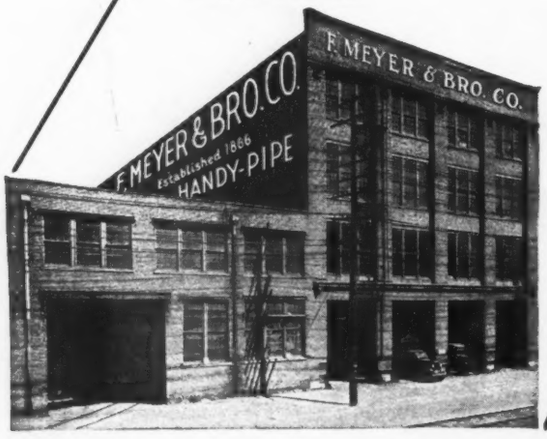
The Tin Pan Business That Grew Up!

In March, 1866, Frank Meyer founded this business as a "tin shop", making and selling tin pans and pots—and ever since then, at the location of our present offices, 1311-13 S. Adams Street, there has been a "Meyer" hardware store—known for many years, now, as "F. Meyer & Bro. Co."

The business started to grow at once—and is still at it. In 1894 HANDY FURNACE PIPE was offered the furnace trade. It was as much of a novelty then as pre-fabricated duct-work was recently—but furnace installers have learned long since that HANDY products are the most profitable in the long run. And they know that, today,

Handy Pipe Is Made To Outlast the Buildings It Goes Into

in the fine, big, newly-equipped buildings shown below — with even indoor loading and unloading facilities.



And we are very proud that in this, our "Diamond Jubilee" year, wherever warm air furnaces are installed, HANDY PIPE is the standard of quality.

In our new and enlarged home, we are making a finer product under the most favorable working conditions — and we invite every furnace installer in the United States to share in the celebration of our Diamond Jubilee by increasing and assuring his profits with HANDY PIPE AND DUCT WORK.

F. Meyer & Bro. Co.
Peoria - - - - Illinois

"The Leader Line"

NEW 40 SERIES
GRAVITY
BASEBOARD
REGISTERS

TWO-PIECE CONSTRUCTION offers DEFINITE LEAK-PROOF INSTALLATIONS.

Flexible Grille-Bars adjustable with Setting Wrench Furnished.

MOST FOR YOUR MONEY

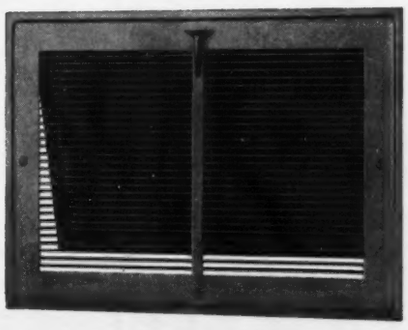
No. 40 Series Offer Modernistic Non-Vision Features.

MAXIMUM FREE AREA—RESISTANCE LESS than with other lines and the Conventional Gravity Baseboard.

METALAC FINISH (at Black Japan) a Soft Brownish Antique Brass Finish is featured with the No. 40 SERIES.

CONVERSION Installations made Simple and Economical with No. 40 Series. Fits the Standard Gravity Register Head.

YOU CANNOT AFFORD TO OVERLOOK THIS OUTSTANDING VALUE



No. 240 U. S. Side Wall Register matches the No. 40 Line Perfectly. When furnished with Gaskets for Conversion Installations it completes the Clean Leak-Proof features of the 1941 LEADER LINE—THE NO. 40 SERIES.

Write for latest 28 A-C Air-Conditioning Register Catalog.

UNITED STATES REGISTER CO.

BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY • SAN FRANCISCO • NEW YORK, N. Y.

CANADIAN MANUFACTURING DISTRIBUTORS—Canada Register & Grille Co., Ltd., Toronto, Ontario

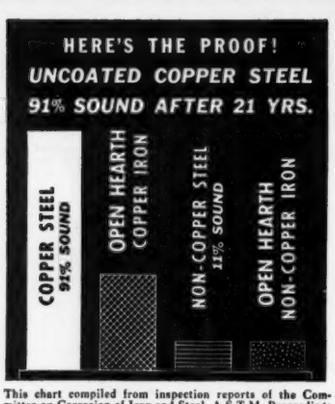
LIFE INSURANCE *for Duct Work!*

The added copper makes the big difference —it doubles the life of sheet steel.

COPPER added to steel doubles and often triples sheet resistance to atmospheric corrosion. And in modern air-conditioning and ventilating systems, this resistance is a big factor—*duct work is costly to replace!* The steel selected for any important job should be able to withstand the constant attacks of atmospheric corrosion over a long period of years — and we know from actual experience that U·S·S Copper Steel Sheets will give the required service.

U·S·S Copper Steel Sheets are well known for their superior corrosion resisting qualities in a wide range of industrial applications where gases and other liquids or vapors are present.

Another important feature is the splendid workability of U·S·S Copper Steel Sheets. The ease with which they can be fabricated on the job cuts down installation time and results in substantial savings. U·S·S Copper Steel Sheets, both galvanized and black, are quickly available in all important cities. For complete information write to one of the companies below.



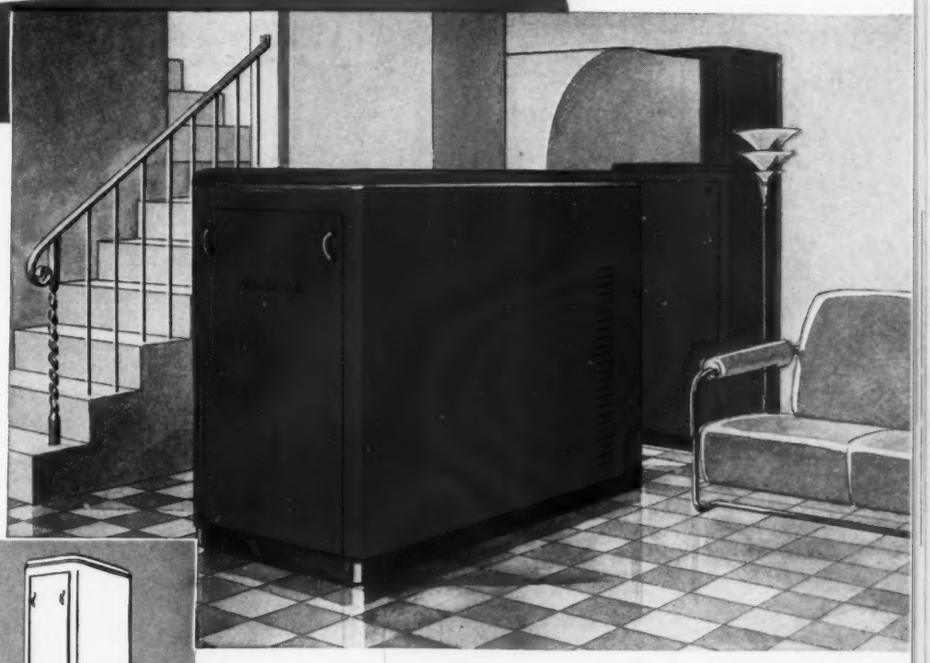
This chart compiled from inspection reports of the Committee on Corrosion of Iron and Steel, A.S.T.M. Proceedings 1937, shows results of tests carried on at Annapolis, Md. from 1916 to 1936. After 21 years' exposure, 91% of COPPER STEEL sheets remained "sound" (unperforated). Other materials were decidedly inferior.

U·S·S COPPER STEEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
Scully Steel Products Company, Chicago, *Warehouse Distributors* · United States Steel Export Company, New York

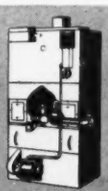
UNITED STATES STEEL

CHRYSLER AIRTEMP MAKES A COMPLETE LINE—



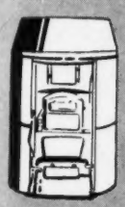
The Airtemp year-'round air-conditioning unit is a combination of a modern, air-conditioning furnace—either oil, gas or coal fired—and Airtemp's packaged cooling unit—long used in homes and business places for summer air conditioning. The same blower fan, filters and ducts which circulate, clean and distribute warm air in winter are used in summer cooling. Mass production on both furnace and cooling unit has lowered costs and selling prices.

*Gas-fired furnace



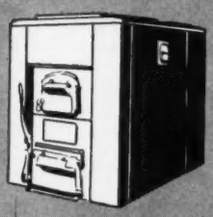
*Thrift model furnace

*Oil-fired furnace



Gravity coal furnace

"Packaged" cooling unit



*Coal-fired furnace

Focused Flame oil burner

Twin Airflow oil burner

Cast-iron boiler

Furnace capacities: 70,000 to 200,000 B. T. U. output
Oil burner capacities: ¾ to 5 gallons #3 oil per hour

*Air-conditioning furnaces

AIRTEMP HAS A NEW MONEY-MAKING PROPOSITION FOR DIRECT DEALERS—

THE CHRYSLER AIRTEMP Proposition

It is based on the 5 factors that Chrysler Corporation's experience has shown mean retail success: (1) *Products*—a complete line, soundly engineered, designed and manufactured. (2) *Priced* competitively for superior quality. (3) *Gross Profits*—permitting sound merchandising, good service, and a fair net profit. (4) *Sales Promotion*—Factory cooperation in dealer advertising and retail selling. (5) *Reputation*—The nation-wide acceptance of a name for quality and fair dealing.

Send today for the interesting new Airtemp Proposition Book.

AND OFFERS AN EXCLUSIVE SALES LEADER

A Complete Line—Airtemp offers direct dealers the industry's most complete line of heating and cooling equipment—a complete line of air-conditioning and gravity furnaces for all standard fuels, boilers both oil and gas fired, oil burners, room coolers, packaged cooling units and central cooling systems. All are competitively priced. All are engineered, designed, manufactured and warranted by the Chrysler Corporation.

Year-'round Air Conditioning—Airtemp also offers its dealers an *exclusive sales leader*—the combination heating and cooling unit pictured above. Now, for the first time, moderate-priced homes can enjoy year-'round comfort! The cooling unit can be sold for as little as $2.69 a month extra on an F. H. A. 20-year mortgage. Airtemp's winter air-conditioning furnace is the only one to which a matched cooling unit can be added at any time.

CHRYSLER AIRTEMP

AIRTEMP DIVISION OF CHRYSLER CORPORATION • DAYTON, OHIO

AIRTEMP DIVISION, CHRYSLER CORPORATION,
DAYTON, OHIO, Dept. A.

Gentlemen: I would like to look over your new Proposition for direct dealers.

*Name*_____

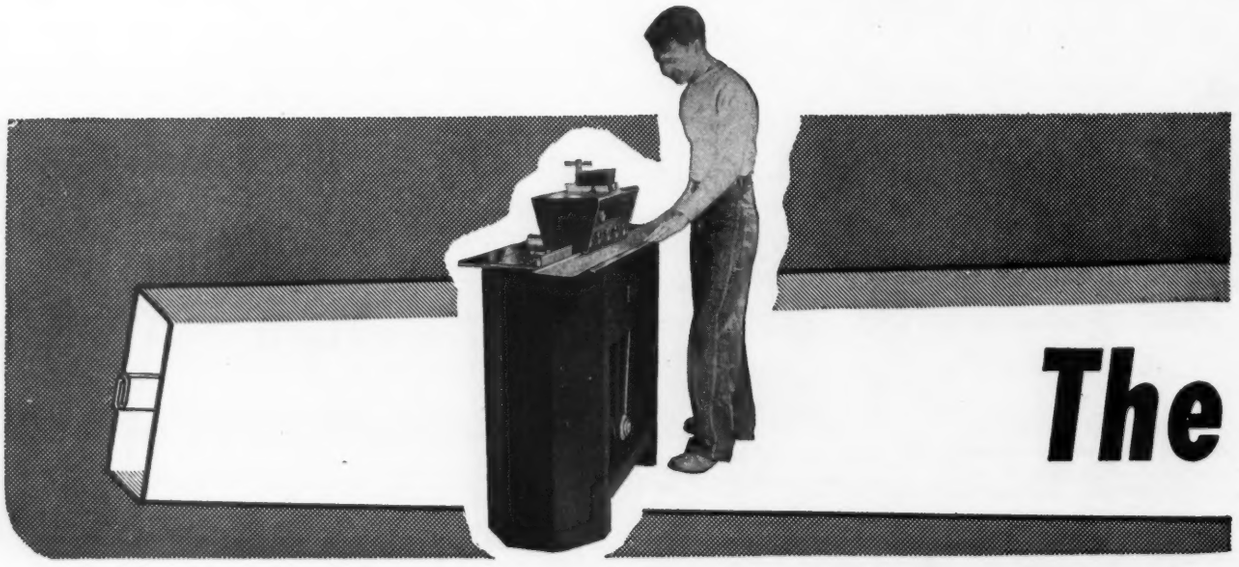
*Address*_____

*City*_____ *State*_____

CAN YOU AFFORD TO PAY FABRICATING THESE FITTINGS

Every dollar you save on production costs means one more dollar gross profit when the job is completed. Every dollar spent needlessly is money thrown away—your money!

And a large part of hand fabrication costs are needless costs—costs that could be sharply reduced by Lockformer methods. For one man and a Lockformer, as an example, can make more Pittsburgh Locks than sixteen men working at eight brakes. Right Angle Flanges, Double Seam Locks and Drive Cleats are made with similar savings. Assembly time is saved, too, because locks are always uniform, need no further prying open. Preparation time is saved because sheets need no re-squaring.



The

TWICE AS MUCH FOR AS OTHER CONTRACTORS DO?

NO? Then read this!

Sounds almost too good to be true, we know. And we don't blame the skeptical for looking for the "joker" in our story. It certainly isn't the cost of the Lockformer, since prices begin at $163.00—and even that small amount can be spread over a convenient period through time payment plans.

It isn't the shop space required since the equipment requires little—saves a lot more than it uses. Can't be the maintenance expense since owners universally report that this figure is either negligible or else doesn't even exist. Can't be a slow return on the money invested because Lockformers, time and again, have paid for themselves out of savings in a month or two—sometimes on the first job on which they were used.

NO, THERE IS NO "CATCH". If you're in the Sheet Metal Business and do even an occasional small duct job, you should have a Lockformer. If you lack first hand knowledge of the equipment, we'll be glad to arrange a demonstration. If you're familiar with the Lockformer but have "put off" getting one, it will pay you to ask yourself, in all seriousness, this question: **"WHAT AM I WAITING FOR?"**

LOCKFORMER Co.

4615 ARTHINGTON STREET • CHICAGO

"How can that little thing *Heat the House?*"

There's a New Leader in the Control Field

Many of them really know better, but most householders—men as well as women—think of the thermostat on the wall as the source of their warmth and comfort. To them, it's the heating system itself.

The notion isn't altogether silly, either—the fact is that any automatic heating equipment, no matter how carefully built and installed, is completely at the mercy of the controls which are an integral part of the system.

Twin Contact Controls have risen to quick leadership in the field for one supreme reason. They do their work accurately and dependably, with such remarkable freedom from service demands that they have become the talk of the industry. They are built, not to be sold as individual accessories, but to work faithfully and well as members of a team with the rest of the heating plant.

Your service calls will be fewer, your customer good will greater, if the heating team you sell includes Twin Contact Controls by Perfex.

PERFEX CORPORATION

500 W. Oklahoma Avenue, Milwaukee, Wis.

Twin Contact Controls

● **IT TAKES CONFIDENCE** to do a high trapeze act. But the performers have it. And they handle their job, successfully, day after day.

It took confidence, too, for Winkler to challenge the stoker industry three years ago. But Winkler **had** the confidence—based on long years of stoker training and experience. Winkler success has been *sensational*—and Winkler distributors don't have to worry about *stoker profits*. Today, Winkler is the pacemaker of the industry.

Each year's sales have doubled the previous year. Each year, hundreds of stoker merchants change to Winkler. Each year, Winkler distributors in 35 states earn greater profits than ever before. *Why?*

Back of Winkler Distributors is a complete line of brutally strong, expertly engineered stokers, with exclusive features that are important to the stoker buyer—powerful, *Fully Automatic Transmission, Eez-Air Control, Pneumatic Smoke-Back Eliminator—the best and most salable stokers on the market!*

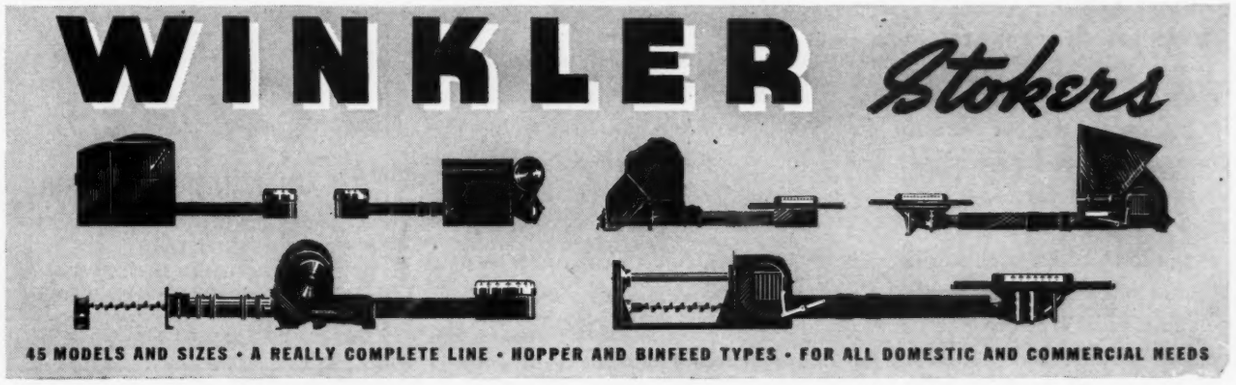
Back of Winkler Distributors is the *finest Sales Service* in the industry—organized and developed from the viewpoint of distributor profits. Back of Winkler Distributors is an *unexcelled Distributor's Training Program* —geared to modern competitive times.

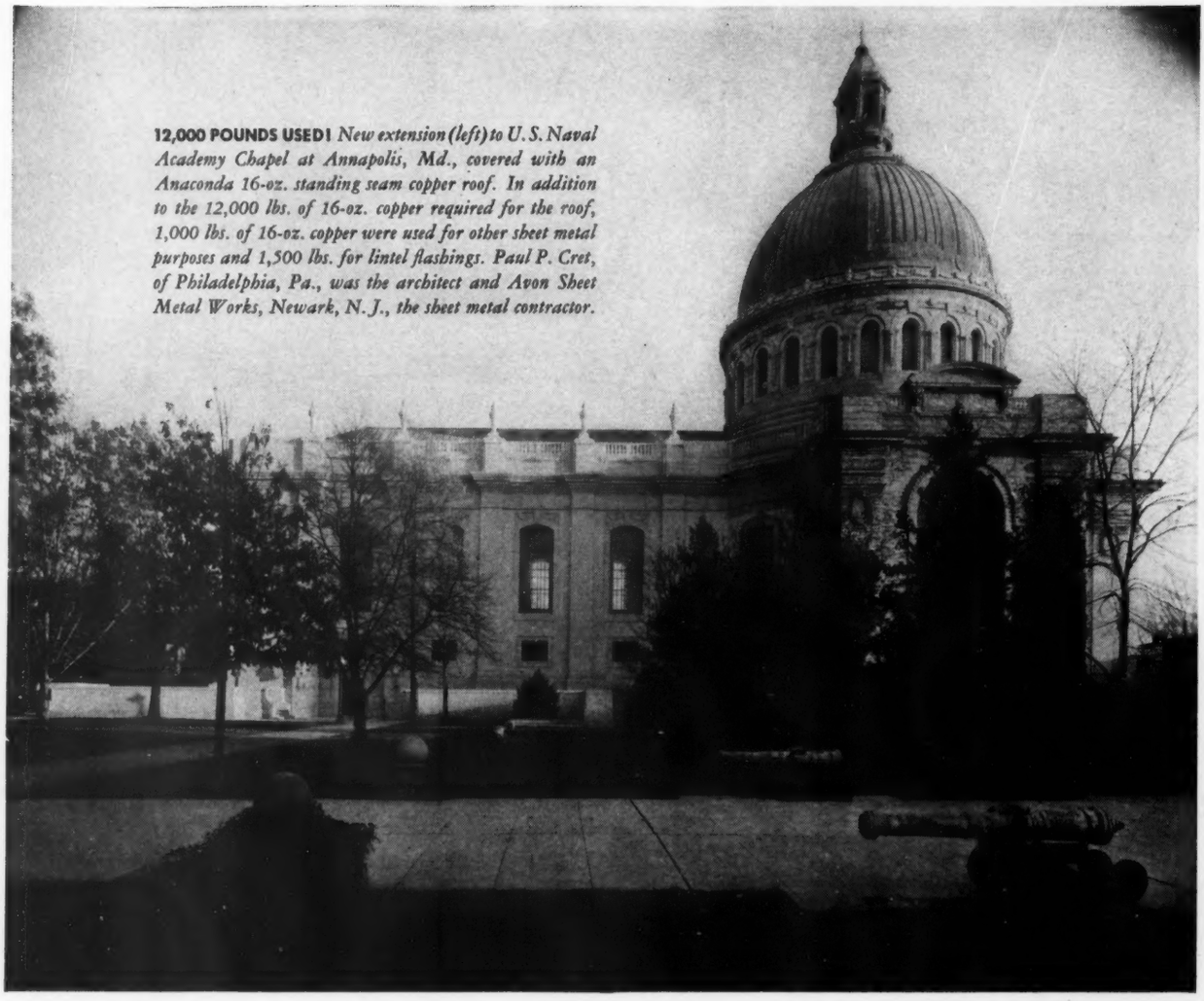
Back of Winkler Stokers are long years of stoker experience, and mass production facilities to produce stokers at the *lowest prices* in the industry, quality considered. Back of Winkler Stokers is an unqualified confidence in the integrity of stoker distributors, and an unwavering determination to help distributors make money.

● **WHY WORRY** about your stoker profits? Be **sure** of them—with Winkler back of you. Investigate the Winkler Direct From Factory Franchise today.

U. S. MACHINE CORPORATION

300 WEST MAIN STREET • LEBANON, INDIANA


WINKLER Stokers
45 MODELS AND SIZES • A REALLY COMPLETE LINE • HOPPER AND BINFEED TYPES • FOR ALL DOMESTIC AND COMMERCIAL NEEDS



12,000 POUNDS USED! *New extension (left) to U. S. Naval Academy Chapel at Annapolis, Md., covered with an Anaconda 16-oz. standing seam copper roof. In addition to the 12,000 lbs. of 16-oz. copper required for the roof, 1,000 lbs. of 16-oz. copper were used for other sheet metal purposes and 1,500 lbs. for lintel flashings. Paul P. Cret, of Philadelphia, Pa., was the architect and Avon Sheet Metal Works, Newark, N. J., the sheet metal contractor.*

New extension to U. S. Naval Academy Chapel gets 16-oz. Anaconda Copper roof!

Another indication that copper roofing means business for sheet metal men

Of course, jobs like this one aren't going up everywhere, but there are less pretentious sheet copper roofs being installed all over the country. The potential market for copper roofing is big enough and broad enough to mean real business to the sheet metal worker who will go after it. Whether it be on residences, churches, schools and clubs, or monumental buildings, sheet copper roofing is business for *you*.

Anaconda offers 10-ounce and heavier sheets to give you an interesting price range. Remember, too, these principal advantages of Anaconda Copper: It is durable, fire-safe, light in weight and reasonable in cost. It is architecturally correct; age only increases its attractiveness.

And remember that copper roofing *means extra business* for the metal trade . . . Have you a copy of our 72-page Installation Manual for 10-oz. copper?

ANACONDA

Anaconda Copper

THE AMERICAN BRASS COMPANY

General Offices: Waterbury, Conn.

In Canada:
ANACONDA AMERICAN BRASS LTD.
New Toronto, Ontario
Subsidiary of Anaconda Copper Mining Company

4168

Gas furnace work makes *Extra Money for you*

SERIES EPS GAS-FIRED WINTER AIR CONDITIONING FURNACE. Exclusive Mueller Heat-speeder sections give amazingly rapid response, avoid temperature over-run, save fuel. Heat Levelizer for more uniform, comfortable heating also available.

SERIES E GAS ERA STEEL FURNACE with Heat-speeder sections. Gravity operation. An established performer with a record of economy and dependability.

MUELLER GAS-FIRED UNIT HEATERS. New, profit for you, in space heating for factories, warehouses, hangars.

SERIES SHP GAS-FIRED WINTER AIR CONDITIONING FURNACE. Thrifty comfort for the modern home.

GAS ERA BOILERS — For steam, hot water or vapor. In three styles. Sizes for any residential, commercial or industrial need.

...when you handle the *complete* furnace line -MUELLER

Ready acceptance — Mueller is nationally known for engineering advances in gas heating . . . and the Mueller name, established for 84 years, is continually before the public in Mueller's magazine advertising . . . reaching, according to a recent estimate, over 90% of families contemplating a new home.

Easy installations—There's nothing complicated about Mueller gas furnace installations. The equipment is simple, compact. Assembled and tested at the factory.

Satisfied owners — Mueller gas furnace jobs add to your reputation. They provide the comfort and healthfulness of winter air conditioning . . . the convenience of carefree automatic heat . . . with fuel economy and all-around, lasting satisfaction possible only with *gas-designed* equipment.

Go after gas furnace jobs with Mueller — and enjoy a more successful season.

★ ★ ★ ★ ★

With Mueller you *sell them all* — coal jobs, oil jobs, gas jobs — new jobs, replacement jobs — the extra-profit automatic jobs — the extra-profit air conditioning jobs — small-home jobs or the larger installations . . . and you offer each one the right type and size of handsomely-styled furnace, at the right price . . . Mueller has nation-wide distribution. If you're not acquainted with the Mueller distributor in your territory, write us. Literature and complete information also furnished on request . . . *L. J. Mueller Furnace Company, 2010 W. Oklahoma Avenue, Milwaukee, Wisconsin.*

See the Mueller exhibit at the National ★ Oil Burner Progress Exposition . . . (Philadelphia, March 17-22) Booths 416-418

D-5

MUELLER *Milwaukee*
HEATING AND AIR CONDITIONING

Gas • Coal • Oil

CLOSE MESH DESIGN

IS NOW STANDARD AT NO ADVANCE IN PRICE ON ALL AUER

DURABILT

FLOOR REGISTERS AND COLD AIR FACES

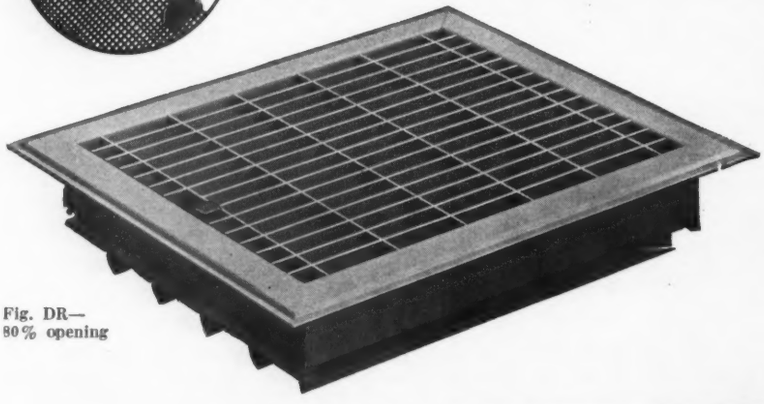


Fig. DR—
80% opening

New models in Auer DuraBilt Floor Registers and Intakes have been improved in appearance and in service with *smaller size* of openings. This narrower mesh (½" x 2") shuts out French heels and small objects—is more practical, and safer. This new design is now *standard* at no higher cost.

DuraBilt Registers and Intakes are assembled from flat steel bars, all locked and mortised at joints. Grille assembly is tenoned into welded frame. Rigid, rugged, durable. All members carefully aligned—all faces level. High percentage of open area. A new and better value —at the *old* price!

A request from you brings complete Auer Register Book, showing all types and designs for air conditioning and for warm air. Special Grille Catalog "G" also available.

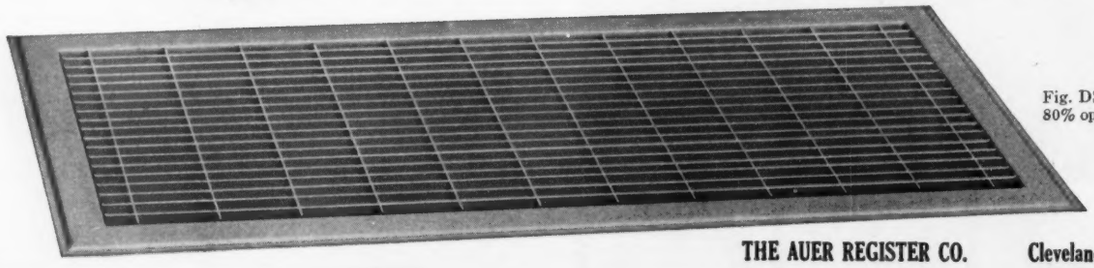


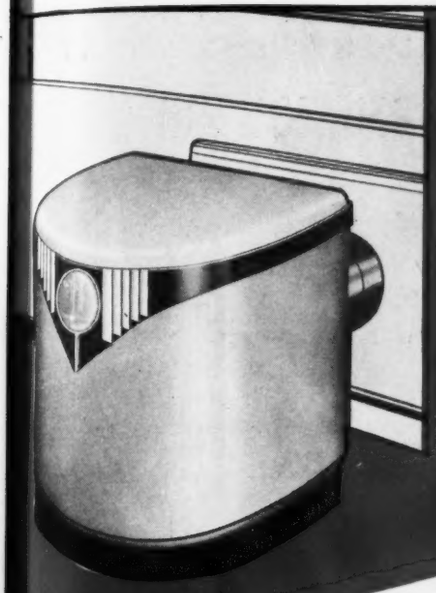
Fig. DSC—
80% opening

THE AUER REGISTER CO. Cleveland, Ohio

AUER REGISTERS

& GRILLES · For Air Conditioning *and* Gravity

BIG NEWS IN HEATING IS WILLIAMS OIL-O-MATIC!
NEW PLANS—NEW PRODUCTS—NEW *Everything*



"Hushed Below A Whisper"

NEW REVOLUTIONARY

ACOUSTI-CASE OIL-O-MATIC

Dealers turn to Oil-O-Matic for the *features that sell!* Now comes the sensational new ACOUSTI-CASE—hailed by dealers as the biggest selling advantage in ten years. It adds superb beauty—it hushes—it protects. Standard on home size Oil-O-Matic Low Pressure Conversion Burners.

Low price Williams Hi-Pressure conversion oil burners—capacities from 1 gallon to 7 gallons of oil an hour.

OIL-O-MATIC *has it!*
Everything YOU NEED IN YOUR MARKET—

A GREAT CONVERSION BURNER LINE

Sell more—make more—with the Oil-O-Matic franchise. It's twice as easy to sell when you have *both* types of oil burners. Williams Oil-O-Matic—longest-lived, most economical of all oil burners. Oil capacities of from ½ gallon to 25 gallons of oil an operating hour. Williams Hi-Pressure oil burners—top quality at an amazingly low price.

SENSATIONAL FURNACE-BURNER UNITS

Oil-O-Matic economy and *extra* long life in a series of beautiful, compact winter air conditioning units. Complete range of sizes and prices to meet every need and budget. 75,000 to 250,000 B. T. U.'s at bonnet. Exclusive selling features galore. Operating economy unequalled in this fastest growing of automatic heating fields.

It's easier to sell the line that's complete! The greater '41 Oil-O-Matic line includes—left: Hi-Boy Winter Air Conditioner—100,000 B. T. U.'s at bonnet; above—Gravity Flow furnace-burner—85,000 B. T. U's at bonnet.

The Oil-O-Matic Winter Air Conditioner shown to the left is built in four popular sizes—famous for operating efficiency and economy.

Get the facts about OIL-O-MATIC '41! A NEW Retail Sales Plan! NEW *Selling* literature! NEW Theme! NEW Approach! NEW Profit Possibilities!

MAIL COUPON TODAY

SEND Money-making NEWS about the greater '41 Oil-O-Matic line of Winter Air Conditioners and Oil-burning Furnaces.

Name .....

Address .....

City ..... State .....

By whom .....

Include information about OIL-O-MATIC
☐ Water Heaters ☐ Boiler-burners

WILLIAMS OIL-O-MATIC HEATING

WILLIAMS OIL-O-MATIC HEATING CORPORATION
BLOOMINGTON ILLINOIS

A GREATER ARMY of manufacturers has standardized on *Randall* PILLOW BLOCKS

●There's good reason why more air-handling units are equipped with Randall Pillow Blocks than any other . . . why the majority of manufacturers use Randalls in their air conditioning equipment. Dependability and efficiency have brought an end to bearing troubles for the equipment manufacturer, contractor and user. Randalls mean freedom from bearing failure and metallic bearing noise in field operation.

Quiet

Be sure to specify Randalls for your equipment. They operate *quietly*. They are self-aligning and self-lubricating. They give extra years of satisfactory service with minimum attention. They are economical and easy to install.

Behind every Randall stands over-a-third of a century's engineering experience in the design and precision construction of "proven" pillow blocks. The new, free 1941 catalog, showing the complete Randall line, gives details and specifications. Write for it today.

ONE-PIECE STEEL HOUSING PILLOW BLOCK

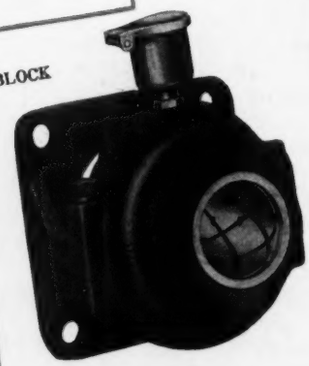
This low-cost bearing is the most popular in the industry. Can be supplied with rubber insulating grommets.

UNIVERSAL PILLOW BLOCK

Designed to meet the most exacting demands of engineers, the Universal operates satisfactorily in any position under severest conditions.

FLANGE PILLOW BLOCK

The rugged construction of the Flange provides ample safety factor for the most severe side mount bearing applications.



Representatives Carrying Stocks

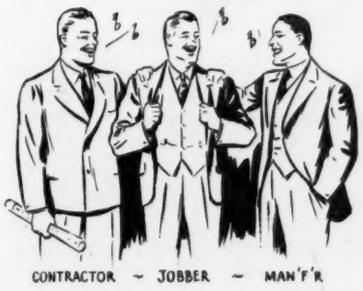
C. W. Marwedel
San Francisco, Cal.

Salt Lake Hardware Co.
Salt Lake City, Utah

Tek Bearing Co.
177 Lafayette, New York City
1192 Commonwealth Ave., Boston, Mass.

RANDALL GRAPHITE PRODUCTS CORPORATION
DEPT. 311 — 609 W. LAKE ST. — CHICAGO, ILL.

Your Friend and Ours —THE JOBBER



It wasn't so many years ago when the Moncrief line consisted mostly of cast furnaces and comprised only a comparatively few items. Those were in the days of the simple life. It was that way with every manufacturer.

The other day we figured up and found that the Moncrief line includes nearly 250 different types, styles and units. It is this new situation that has made the jobber an increasingly important and valuable factor in warm air heating and air conditioning merchandising.

You, Mr. Furnace Dealer, have found that out and realize that you are liable to be called on any time to supply most any kind of unit, and your customer is likely to want it "day before yesterday."

How helpful it is to be able to turn to your Moncrief jobber close at hand with his prompt delivery service for the particular Moncrief unit you want. There are other things you want at the same time, and that your Moncrief jobber can deliver with the unit, saving you time, expense and trouble.

The heating supply jobber is your friend and ours because he serves us to our common advantage, with his carrying ample stocks, making prompt deliveries. The jobber can reduce your inventory, speed up turn-over and in turn give better service to your trade.

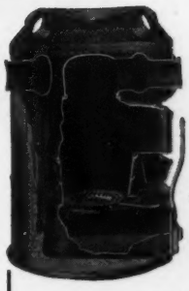
Here's to our friend and your friend, The Jobber. More power to him.

MONCRIEF
CAST FURNACES

Complete Line
CAST and STEEL FURNACES
WINTER AIR CONDITIONERS

Moncrief cast furnaces made a great name for themselves years ago, a name that has consistently stood for high quality and good workmanship. Today the Series "C" is second to none in fundamental design, styling and thorogoing construction. Made with round galvanized, and in square casings finished in smooth green baked enamel to meet all demands and priced to give your client the most for his money.

Send for literature and prices.



SUPERIOR POINTS OF SERIES "C" FURNACES

Only four joints inside the casing, all double-sealed.

One-piece sections are heavy, capacious, smoothly finished . . . Firepot is two piece to allow better for contraction and expansion.

Sections are ground and fitted, assembled and shipped as a unit for quick, easy installing.

Duplex roller-bearing or triangular bar grates, as desired.

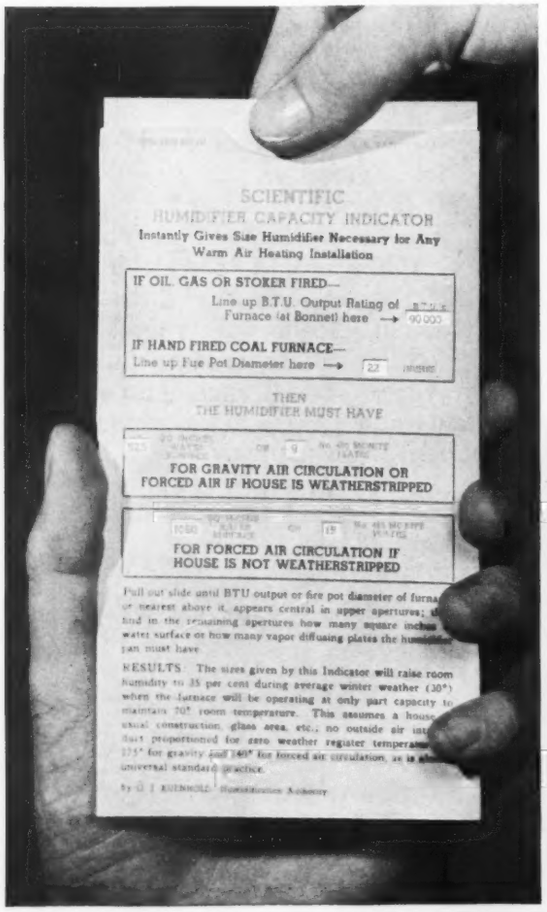
THE HENRY FURNACE & FOUNDRY CO.

3473 E. 49th STREET, CLEVELAND, OHIO

CAPACITY

HOW TO GAUGE IT AND DELIVER IT

Until Monmouth developed—and distributed free of charge—the Humidity Capacity Indicator, the most conscientious of dealers could only **guess** at the capacity required on a given job and hope he was right. On many jobs he couldn't even **hope** to be right because he **knew** that the humidifier on the furnace did not have enough capacity.

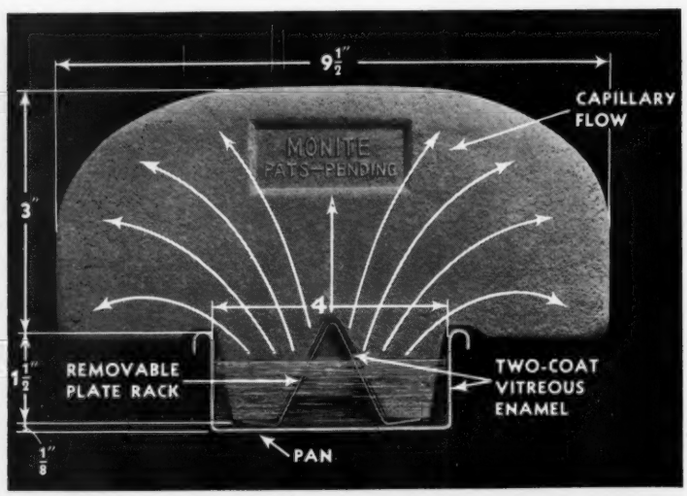

SCIENTIFIC
HUMIDIFIER CAPACITY INDICATOR
Instantly Gives Size Humidifier Necessary for Any Warm Air Heating Installation
IF OIL, GAS OR STOKER FIRED—
Line up B.T.U. Output Rating of Furnace (at Bonnet) here →
IF HAND FIRED COAL FURNACE—
Line up Fire Pot Diameter here →
THEN
THE HUMIDIFIER MUST HAVE
FOR GRAVITY AIR CIRCULATION OR FORCED AIR IF HOUSE IS WEATHERSTRIPPED
FOR FORCED AIR CIRCULATION IF HOUSE IS NOT WEATHERSTRIPPED

Monmouth not only supplies the scientific instrument to gauge capacity—we also supply the plates and controls that positively deliver that capacity. Every Monite Vapor Diffusing Plate equals 70 sq. ins. of water surface. Regardless of how restricted the space in the plenum there is enough room for an ample number of Monite plates.

If you have not received your free Capacity Indicator, write today on your business letterhead. If you do not have complete data on Monite Plates and Monmouth Humidifiers, we will gladly send it to you.

MONMOUTH PRODUCTS CO.

1933 E. 61st St. **Cleveland, Ohio**

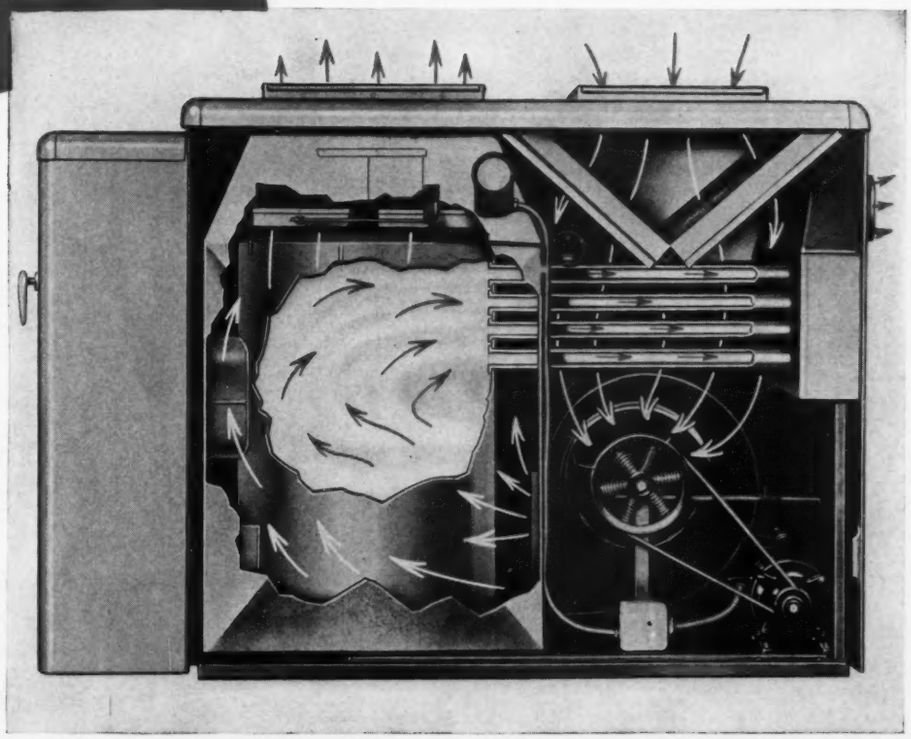


MONMOUTH

The Greatest Name in Humidification

It heats more air!
It saves more fuel!
It makes more sales!

FITZGIBBONS CONTRA-FLO CIRCULATION



A SALES-BUILDING FEATURE OF THE FITZGIBBONS DIRECTAIRE CONDITIONER

Engineers acclaim it a vital principle of efficient heat transfer. Fitzgibbons Contra-flo Circulation drives the incoming cool air through the unit in a direction **contra** or opposite to the flow of the hot gases of combustion. This maintains at all times the greatest temperature **difference** between air and gases. It enables the air to pick up and hold the greatest possible degree of heat. Of course it saves fuel.

Sell the quiet, smooth, economical operation of the Fitzgibbons Directaire and you will SELL MORE AIR CONDITIONING.

Exclusive Sales Franchises Open — Mail this coupon Today!

AA-3

FITZGIBBONS BOILER COMPANY, Inc.
101 Park Avenue, New York, N. Y.

Send me details of Franchise and Catalog Data of the DIRECTAIRE.

NAME..... COMPANY.....

STREET..... CITY..... STATE.....

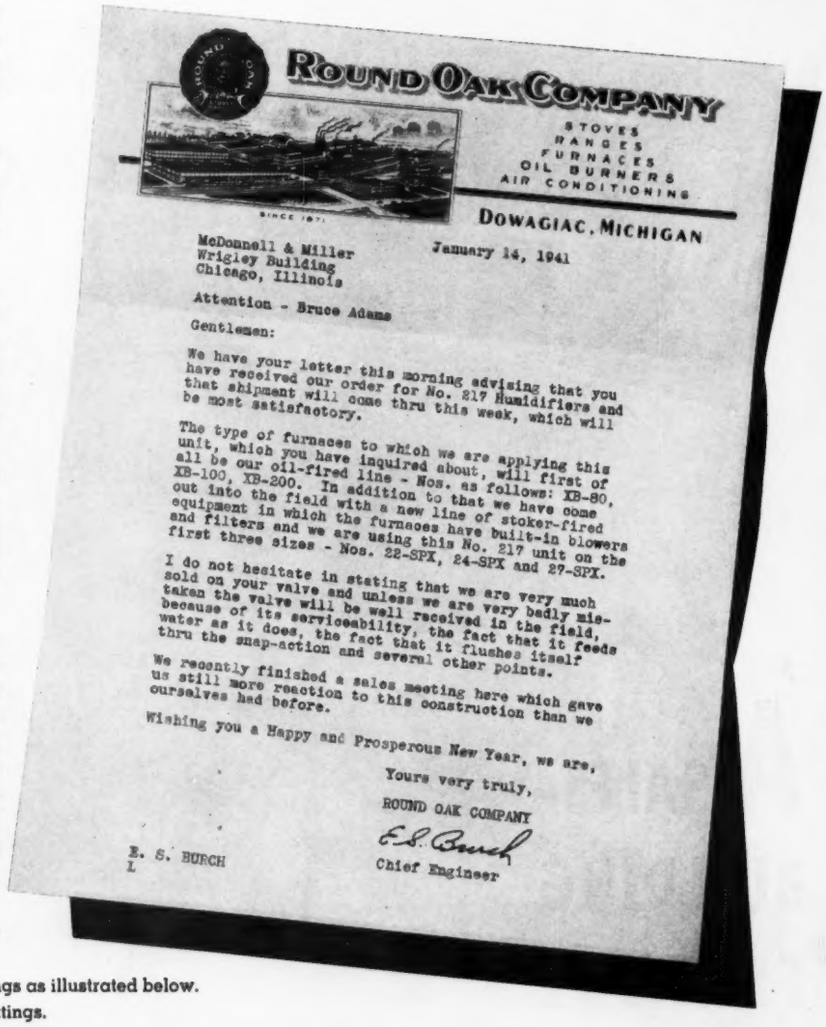
There's ALWAYS a better way

AMERICAN industry got where it is today because it never concedes that the best way to make anything, from a paper clip to a locomotive, has been found.

A number of better ways to do things were found during the last year—among them, a better way to maintain the water level in the evaporating pan of a warm air furnace.

A snap action valve did the trick—got away from the old "seep and dribble" construction. When the water level drops a quarter-inch in the pan an ingenious cam-and-roller mechanism snaps this valve wide open; flushes away the dirt and lime; keeps the orifice clean and the valve operative. When the water level is restored the same mechanism snaps it to a tight closure—leak-proof against city pressures clear up to 150 pounds.

You see this better way here. Others—like the Round Oak Company—have seen it, too, and recognized its better construction as exemplified by the letter above. You probably know of a customer that would appreciate a suggestion from you that he make his humidification unfailing. Right there is your opportunity to strike up an intimate acquaintance with this better way.



ROUND OAK COMPANY

STOVES
RANGES
FURNACES
OIL BURNERS
AIR CONDITIONING

DOWAGIAC, MICHIGAN

January 14, 1941

McDonnell & Miller
Wrigley Building
Chicago, Illinois

Attention - Bruce Adams

Gentlemen:

We have your letter this morning advising that you have received our order for No. 217 Humidifiers and that shipment will come thru this week, which will be most satisfactory.

The type of furnaces to which we are applying this unit, which you have inquired about, will first of all be our oil-fired line - Nos. as follows: XB-80, XB-100, XB-200. In addition to that we have come out into the field with a new line of stoker-fired equipment in which the furnaces have built-in blowers and filters and we are using this No. 217 unit on the first three sizes - Nos. 22-SPX, 24-SPX and 27-SPX.

I do not hesitate in stating that we are very much sold on your valve and unless we are very badly mistaken the valve will be well received in the field, because of its serviceability, the fact that it feeds water as it does, the fact that it flushes itself thru the snap-action and several other points.

We recently finished a sales meeting here which gave us still more reaction to this construction than we ourselves had before.

Wishing you a Happy and Prosperous New Year, we are,

Yours very truly,
ROUND OAK COMPANY

E. S. BURCH
L

Chief Engineer

The McDonnell Snap Action Humidifier Water Control is available in the following forms:

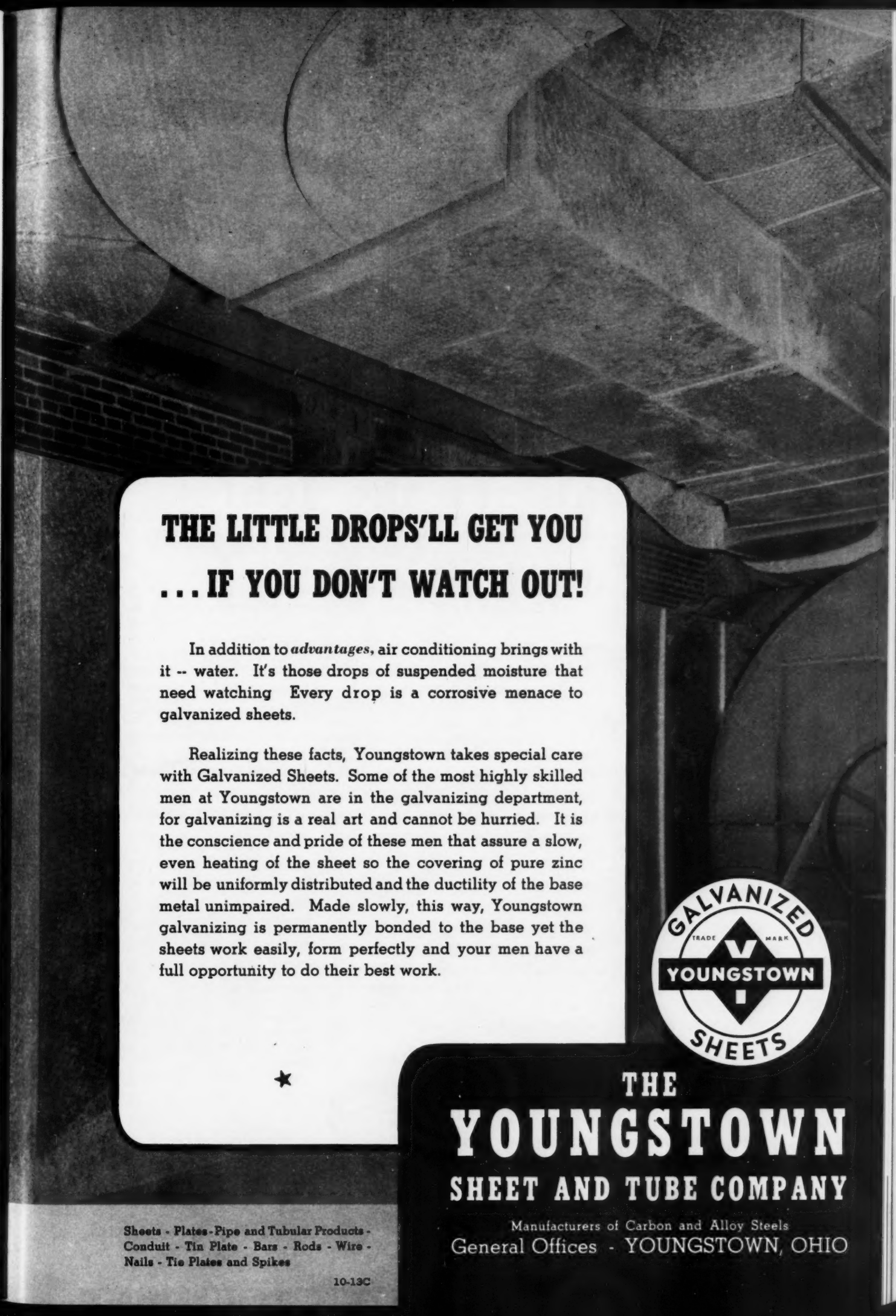
No. 217. Complete with copper tubing and fittings as illustrated below.
No. 117. Same as 217 but without tubing and fittings.
No. 17. Valve and float only (without float chamber).

Write for engineering data

McDONNELL & MILLER, 1318 Wrigley Bldg., Chicago, Ill.

McDONNELL HUMIDIFIER WATER CONTROLS

Your Jobber Stocks Them



THE LITTLE DROPS'LL GET YOU ... IF YOU DON'T WATCH OUT!

In addition to *advantages*, air conditioning brings with it -- water. It's those drops of suspended moisture that need watching Every drop is a corrosive menace to galvanized sheets.

Realizing these facts, Youngstown takes special care with Galvanized Sheets. Some of the most highly skilled men at Youngstown are in the galvanizing department, for galvanizing is a real art and cannot be hurried. It is the conscience and pride of these men that assure a slow, even heating of the sheet so the covering of pure zinc will be uniformly distributed and the ductility of the base metal unimpaired. Made slowly, this way, Youngstown galvanizing is permanently bonded to the base yet the sheets work easily, form perfectly and your men have a full opportunity to do their best work.

★

GALVANIZED TRADE MARK YOUNGSTOWN SHEETS

THE
YOUNGSTOWN
SHEET AND TUBE COMPANY

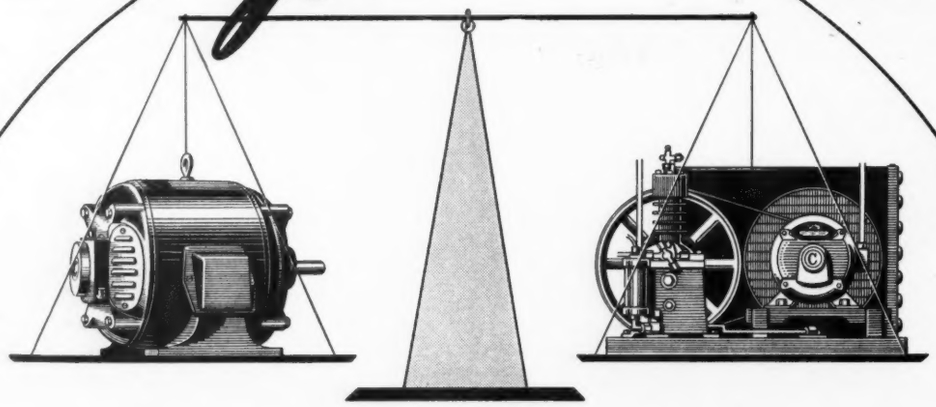
Manufacturers of Carbon and Alloy Steels
General Offices - YOUNGSTOWN, OHIO

Sheets - Plates - Pipe and Tubular Products - Conduit - Tin Plate - Bars - Rods - Wire - Nails - Tie Plates and Spikes

10-13C

In Air Conditioning

CENTURY *Job Selected* MOTORS



Balance the Job!

Every air conditioning installation needs a quiet starting and quiet operating motor. But the different pieces of driven equipment may be better served by different types of motors. For illustration—

Job Requirements	*Century Advantages*
• For air cooling	• Century Type SCH have high torque to start and bring the modern compressor up to speed without over-motoring the load. They are quiet and unusually free from vibration.
• For air heating	• New Century Type SP streamlined standard flange Oil Burner Motor. Both capacitor and "Repulsion Start" type motors for stokers, the latter where low starting current is required. Motor insulated to resist damp basements.
• For air circulating	• Unusually quiet "starting" and "running" *cushion mounted* up to 3 horsepower. Multi-speed. Built-in overload protection. Low starting current.
• For fluid pumping	• Type SCX motors require 35% lower starting current. Starting current is often a very important problem.

To get peak performance from your air conditioning equipment, the motor should be selected so as to best fit the demands of its particular job. That's what we mean when we say Century Job Selected Motors balance the machines they drive — the motor characteristics may be engineered to meet the requirements of any air conditioning application.

Whatever the requirements of your machines or your products, Century Job Selected Motors may well help save production time and step up performance too. Century's wide diversification of motor types, kinds, and sizes, up to 600 horsepower, makes proper motor selection an easy task for the Century Motor Specialist. Why not call him in today?

CENTURY ELECTRIC COMPANY

1806 Pine Street St. Louis, Mo.

Offices and Stock Points in Principal Cities.

Write for

these special Data Sheets on Century Motors and their application.

Split Phase Motors	044A
Repulsion Start Induction Motors	938A
Capacitor Motors	0411
Squirrel Cage Induction Polyphase Motors	1240
Splashproof Motors	6111
Totally Enclosed Fan Cooled Motors	0421A
Slip Ring Motors	1032
Direct Current Motors	1033
Generators and Motor Generator Sets	935

Century MOTORS

One of the Largest Exclusive Motor and Generator Manufacturers in the World

Looking for a Better Deal in Stokers? YOU GET IT WITH FREEMAN

...CHOICE OF AMERICA'S FOREMOST HEATING ENGINEERS

Get set for sales! Freeman sets the pace with this sensational big-value stoker that has no equal in the industry for such outstanding quality at so low a price! See it and you'll agree. This Freeman T-2 Rocket model is complete with Freeman's patented exclusive Fire Stabilizer and other famous Freeman features. A stoker that's smart in appearance and ruggedly built for years of service! Here's your answer to stoker volume *at a profit!*

Available in new colonial blue.

NATIONAL ADVERTISING Paving the Way for Your Sales

A powerful campaign in the Saturday Evening Post, Time, American Home, Better Homes & Gardens, Popular Mechanics . . . starting in April and continuing through October . . . will drive home to your prospects the most timely and dynamic theme in stoker selling: "Freedom with Freeman"! In addition Freeman furnishes more sales helps, gives you more personal cooperation and expert help in selling stokers profitably.

NEW STOKER-FIRED Automatic WATER HEATER

Designed and built by Freeman to meet the automatic hot water needs of homes, apartments, restaurants, barber and beauty shops, hotels, stores, etc. Thousands of prospects mean quick, easy sales! Available in several sizes. A matched unit you will be proud to sell. . .

Can also be used with hot water radiators and pipes as a heating plant for small homes, filling stations, etc.

Available in new colonial blue.

Also: **STOKER-FIRED HEATING PLANTS**

A COMPLETE LINE: From 8 lbs. to 1200 lbs. per hour capacity . . . designed by engineers recognized as leaders in the industry. Includes: Rocket and De Luxe hopper-type domestic models; Straight Line and Relay types in bin-feed stokers; all sizes of commercial and industrial models. Manufactured by an AAA1 rated pioneer stoker manufacturer—now one of the largest in national sales volume, enjoying an increase in 1940 of 71% over 1939.

GET THE FACTS... Mail Coupon TODAY!

FREEMAN STOKER DIVISION
ILLINOIS IRON & BOLT CO. *(Established 1864)*
918 S. MICHIGAN AVE., CHICAGO, ILLINOIS

FIRM NAME _____

ADDRESS _____

CITY _____ STATE _____

SIGN OF A DEPENDABLE MERCHANT

Good merchandise and good merchants, somehow, go hand in hand.

That's why Crescent Tool dealers are usually a good source of supply for *any* type of tools. They display and sell the Crescent line because they know that all Crescent tools, however priced, represent a worthwhile value. They know that Crescent does make really fine hand tools, and they know that tool users appreciate that fact. They know, too, that Crescent stands back of its guarantees and representations.

And any dealer who prefers to sell that kind of merchandise is apt to be a pretty dependable merchant.

CRESCENT TOOL COMPANY, JAMESTOWN, N. Y.

CRESCENT and Smith & Hemenway TOOLS

MASS PRODUCTION COMES TO THE AIR CONDITIONING FIELD

'O GIVE YOU THESE NEW LUID HEAT UNITS PRICED) SELL TO THE SMALLER HOMES

Oil Burner Pioneer Again Sets Pace With New FHA Type Air Conditioners

With the introduction of the Fluid Heat FHA Type Air Conditioners, Fluid Heat has taken high quality Air Conditioning equipment out of the luxury class and made it available to practically every builder of a small home throughout the country. To do this, Fluid Heat, after years of Burner and Furnace manufacturing, has installed a completely modern mass-production line to build FHA Units complete from special steel plates direct from steel mills into finished burner-furnace units.

Today Fluid Heat Dealers everywhere, with the new FHA Air Conditioners added to the famous complete Fluid Heat line of home-heating equipment, are cashing in in a big way on the trend to low-cost, effective, complete winter Air Conditioning.

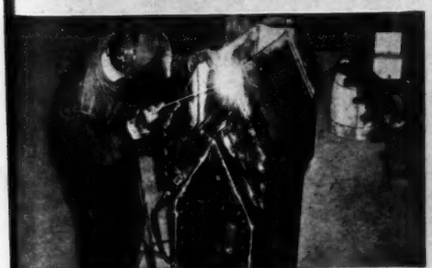
The FHA Units are marvels of the economy of mass-production. Quality-built, with savings made in manufacturing instead of in materials, they offer many firsts—and many finer features—not found on other Air Conditioners costing much more. The burner and furnace are engineered as a Unit—not put together as a make-shift. The jackets and burners are finished in "hammered" gray baked by the Infra-Red method. The Burner is approved for firing rates of 7/10 to 3 G.P.H. by Underwriters Laboratories under U. S. Commercial Standards CS75-39. Capacities from 80,000 to 215,000 B.T.U. at bonnet.

A Complete Line of Home-Heating Equipment

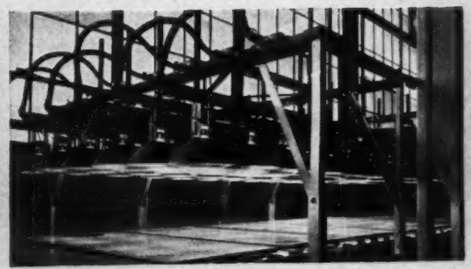
1 Pressure Burners, 6 Rotary Burners, 1 Domestic Hot Water Heater, 7 Winter Air Conditioning Units, 3 Burner-Boiler Units.

✓ CHECK THESE SPECIAL FEATURES

- ✓ Special Factory-Built Combustion Chamber.
- ✓ Economical, Quiet Fluid Heat Oil Burner.
- ✓ Observation Port.
- ✓ Heavy Steel Plate Furnace.
- ✓ Efficient Insulation.
- ✓ Combination Fan and Limit Control.
- ✓ Clean-Out Opening.
- ✓ Spun Glass Filters.
- ✓ Quiet Blower of Ample Capacity.



ctrically Welded Furnaces, built completely by itsmen in the modern Fluid Heat factory, reduce ts, permit unit mass manufacture.



New Infra-Red Ray Dryer which bakes the enamel on Fluid Heat Air Conditioner jackets, one of the few such units in the country today.

Homes as Small as These are now prospects for Air Conditioning when you sell the new Fluid Heat FHA Type Air Conditioners.

fluid heat
AIR CONDITIONER

"World's Economy Champion"

A PRODUCT OF THE ANCHOR POST FENCE COMPANY, BALTIMORE, MD., ESTABLISHED 1882

Fluid Heat Division, Anchor Post Fence Co.
6728 Eastern Avenue, Baltimore, Maryland.
Please send me at once details of the Fluid Heat Air Conditioners and the complete Fluid Heat Line.

Name_____

Firm_____

Address_____ State_____

City_____

His "Stainless" Reputation Keeps The Work Rolling In!

Winning a steady income from ARMCO Stainless Steel roof drainage work is surprisingly easy—as Contractor C. H. Milleman of Butler, Pennsylvania, has learned. He writes:

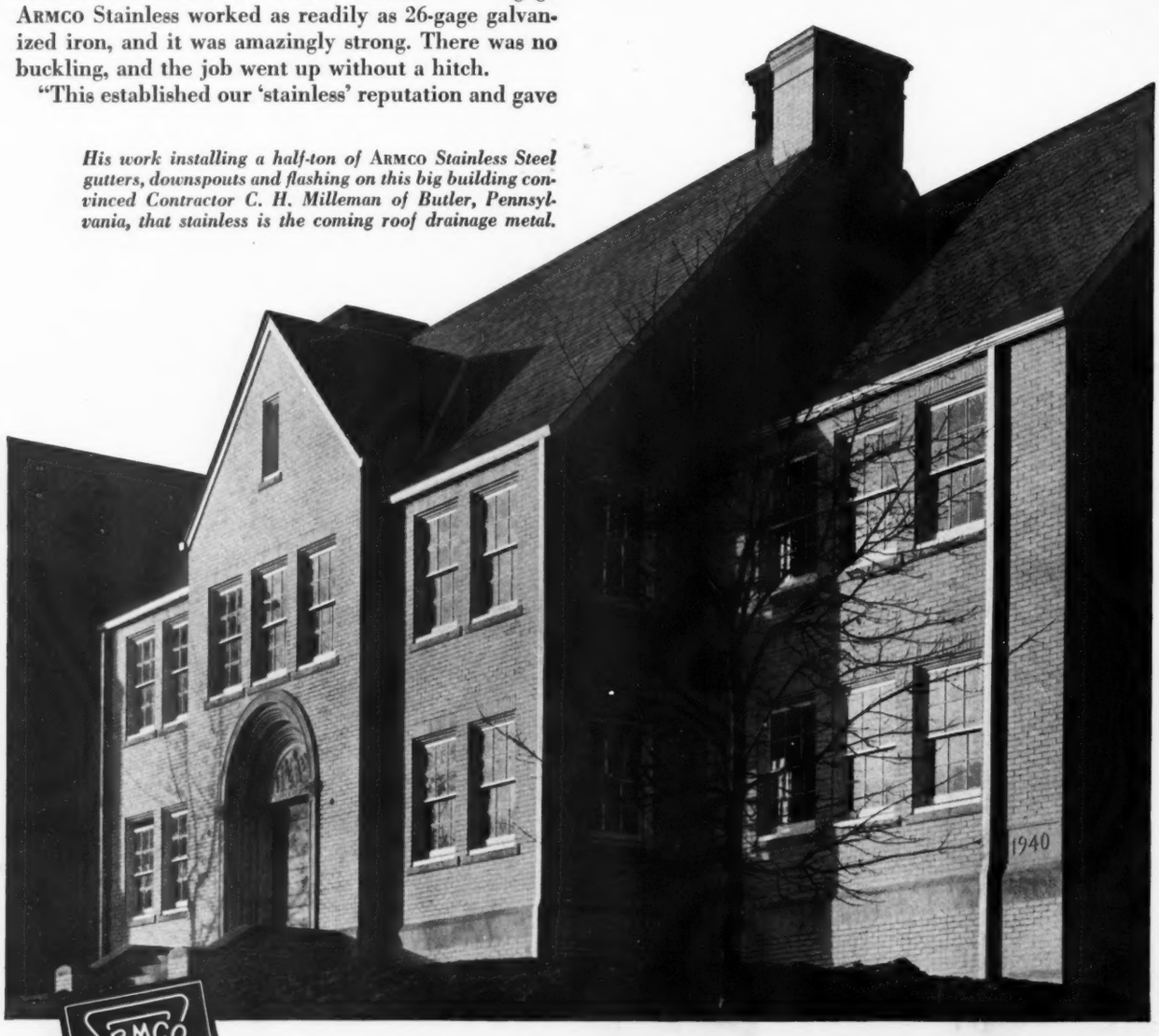
"I first discovered the money-making opportunities of ARMCO Stainless when I began using it for table-top and restaurant work. Then I had a chance to compete for a half-ton of stainless roof drainage work on an $80,000 church building.

"My experience gave me all the knowledge and confidence I needed for a successful bid. The 28-gage ARMCO Stainless worked as readily as 26-gage galvanized iron, and it was amazingly strong. There was no buckling, and the job went up without a hitch.

"This established our 'stainless' reputation and gave us the inside track on a quarter-ton of ARMCO Stainless gutters and pipe for a local bottling plant. We like ARMCO Stainless Steel and expect to use it often. It is the coming roof drainage metal."

You too can enjoy the same experience. Once *your* "stainless" reputation is established, the work will flow in. We'll gladly help you get started. Just call the nearby ARMCO Distributor, or write us direct for sales and fabricating information. The American Rolling Mill Company, 651 Curtis Street, Middletown, Ohio.

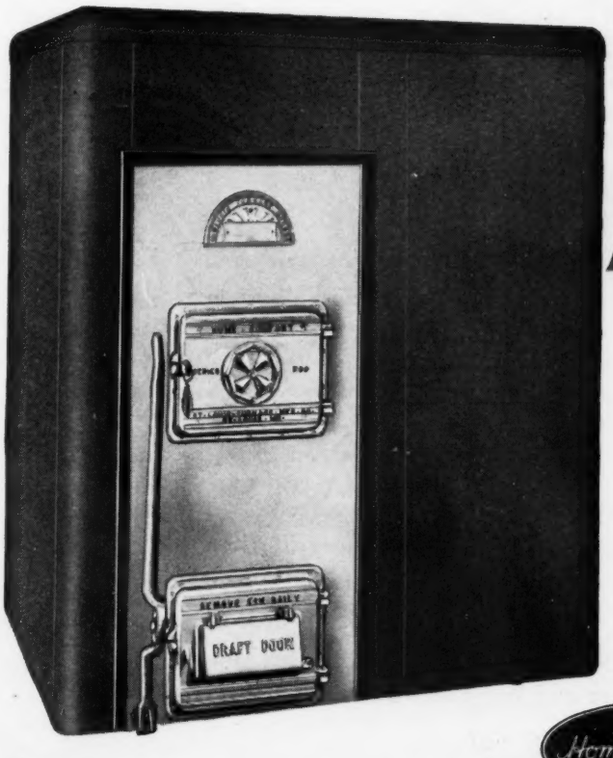
His work installing a half-ton of ARMCO *Stainless Steel gutters, downspouts and flashing on this big building convinced Contractor C. H. Milleman of Butler, Pennsylvania, that stainless is the coming roof drainage metal.*



ARMCO STAINLESS STEEL

HEATING MEN SAY,

"We save at least an hour's time in erecting this unit!"



THE Solaraire-

A HOME COMFORT FURNACE

Because no screws, nuts or bolts are required to assemble this modern, efficient coal-burning furnace, you can save at least an hour's time in your set-up. This streamlined unit combines efficiency with attractive appearance, and, since it is backed by the 50-year-old HOME COMFORT name, it is very easy to sell. In ordering, it is unnecessary to specify right or left hand installation.

The Complete HOME COMFORT LINE

- There are no lost sales when you handle HOME COMFORT Furnaces. Coal, oil, or gas—in either gravity or forced air types. Scientifically designed square casings for gravity installations are available.
- Write today for our Dealer Proposition and new Price List. Feature the Home Comfort Line—and you'll make more sales—easier, quicker, more profitable!

Home Comfort FURNACES

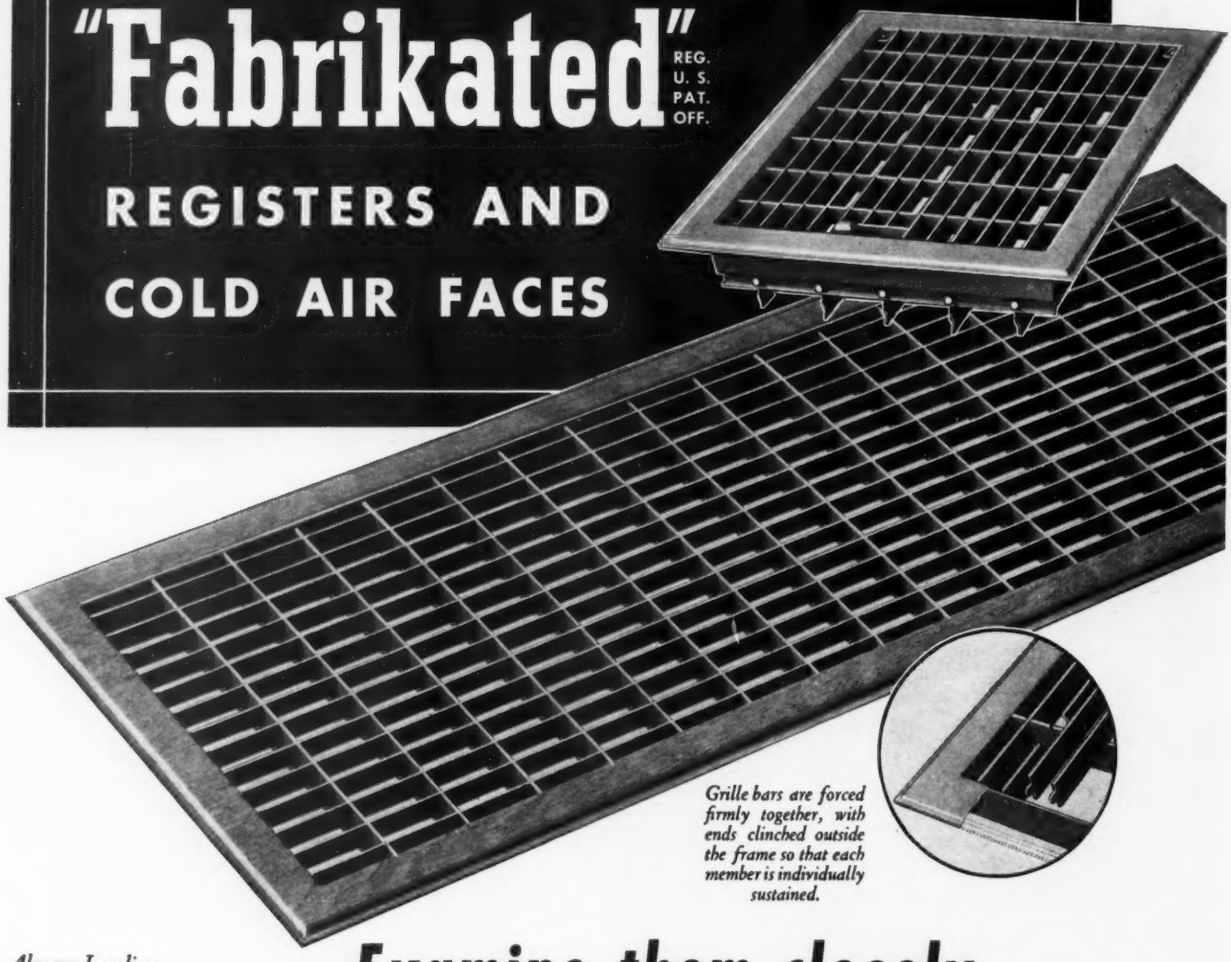
ST. LOUIS FURNACE MFG. CO.

2901-11 ELLIOT AVE. ST. LOUIS, MISSOURI

INDEPENDENT

"Fabrikated" REG. U. S. PAT. OFF.

REGISTERS AND COLD AIR FACES



Grille bars are forced firmly together, with ends clinched outside the frame so that each member is individually sustained.

Always Leading... Always Progressing

Examine them closely

See how the steel outer frame is welded to form a solid piece; how the grille is made of steel strips set on edge with the ends of the grille bars extending through openings in the outer frame as here illustrated. The edges of the interior grille bars are made of rolled smooth stock which avoids the hazard of rough die-cut edges. Quality expressed in every line, and with all, Independent "Fabrikated" Registers and Faces afford the utmost in free area.

Send for Catalogs

THE INDEPENDENT REGISTER CO.

3747 EAST 93RD STREET, CLEVELAND, OHIO

But they are NOT "Sisters Under the Skin"

NITEAIR COOLING MAKES THIS HOME COMFORTABLE ON HOTTEST NIGHTS.
SWELTERING PENETRATING HEAT MAKES THIS HOUSE UNBEARABLE.

There are BIG PROFITS *for you in this idea when you sell* NITEAIR COMFORT COOLING

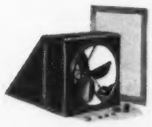
This spring and summer, as never before, you can take the slump out of your summer sales by selling this idea to hundreds of prospects. It's the fastest growing business you ever saw. No saturation! No trade ins! Big dollar profit! And now NITEAIR-COOLING can be had at the lowest prices in all our history!

Think of the market! Millions of homes, apartments, offices, stores, clubs, churches, from coast to coast, and as far north as Canada. Tenants as well as owners are prospects because there are models that are portable appliances.

NITEAIR-COOLING units for 1941 give you the most complete line of comfort cooling units ever offered. A model to cover every conceivable type of installation . . . including attic, wall, window, basement, and commercial installations. And Lau engineers will gladly help you solve difficult or unusual problems at no extra charge.

PRICES START BELOW $50! Write for complete details today.

NITEAIR WINDOW FAN
For bedroom, apartment, kitchen, office, store, etc. Retails for less than $50.00.



NITEAIR ATTIC FAN PACKAGE UNIT
Complete with vent box, ceiling grille or automatic ceiling louvres and accessories.

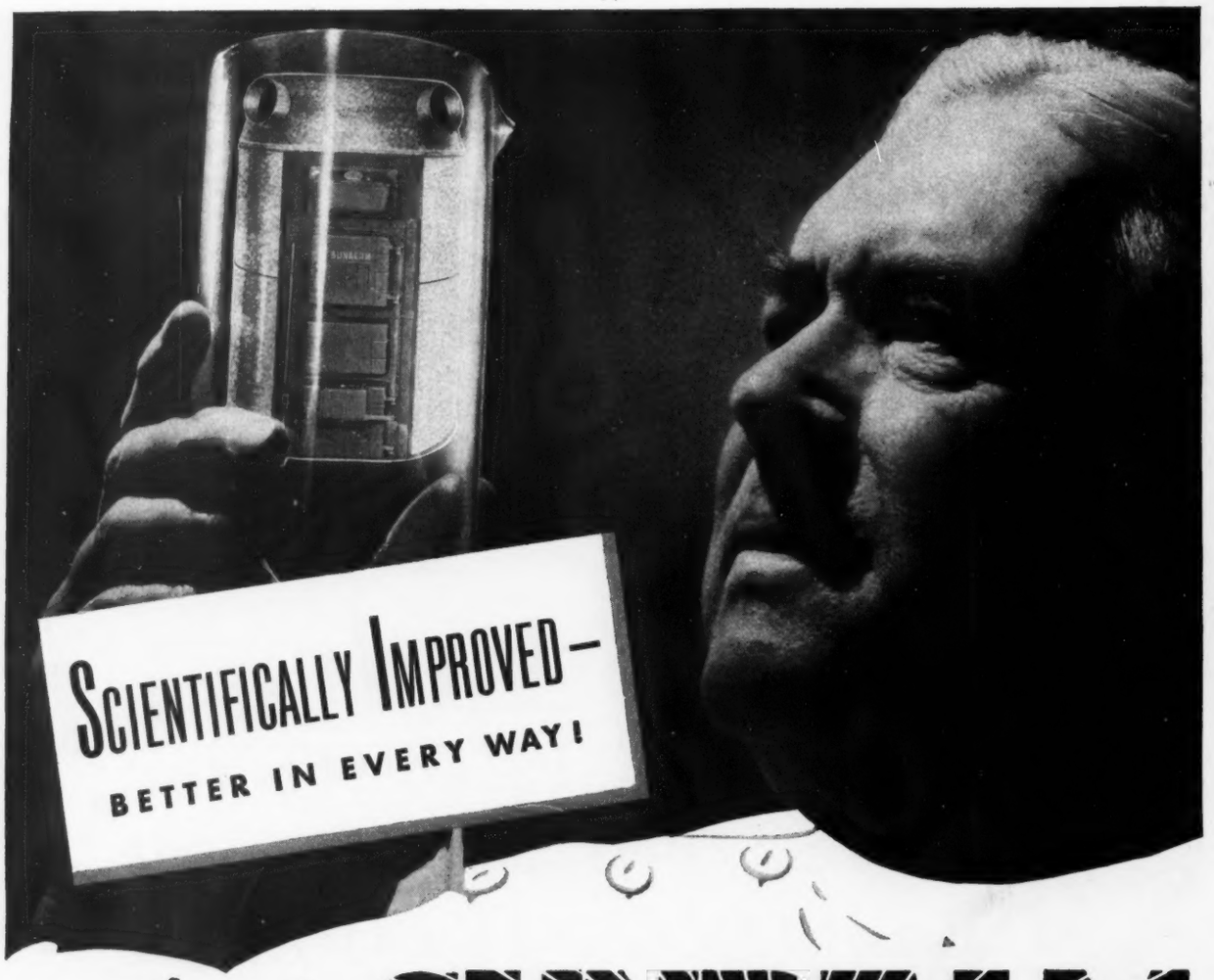
NITEAIR PANEL UNIT
For installations in attic, wall, basement, and commercial installations. Quiet, efficient, light in weight.

THE LAU BLOWER COMPANY
2005 Home Ave. Dayton, Ohio

YOU CAN *Profit* MAIL COUPON

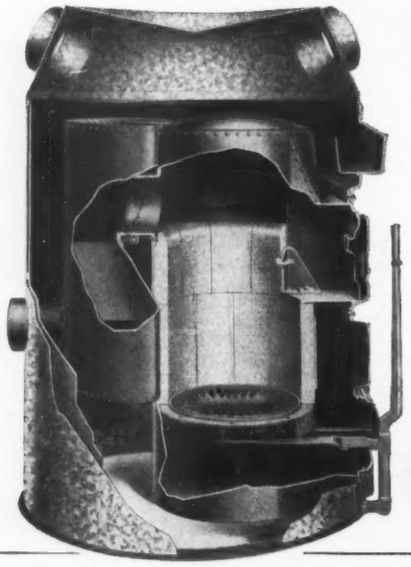
The Lau Blower Co.
2005 Home Ave., Dayton, Ohio
Please send me full details on NITE-AIR-COOLING UNITS together with complete merchandising program, discounts, and catalog.

Name .....
Street .....
City ..... County .....
State .....



The New SUNBEAM

SERIES No. D-500 STEEL FURNACE



WE ARE PROUD to present the new Sunbeam Furnace Series No. D-500—formerly the Series No. 500. For this popular, low-cost, quality Furnace possesses finer features than ever before. *It is de luxe in everything but price!*

Available in models for Coal or Oil, it will win the quick approval of home-owners who seek a high quality heating plant at a budget fitting price. And right now you can stimulate extra modernization sales with our special Summer Finance Plan: No down payment, *no payments till October 7th!* Then up to 3 years to pay on low monthly terms. Best of all, you get cash promptly when the job is done.

A few of the quality features of the Sunbeam Furnace Series No. D-500 are shown at left. Read them now and then write for full information and for the name of the Sunbeam Jobber nearest you.

AMERICAN HEATING EQUIPMENT COSTS NO MORE THAN OTHERS

FOUR OUTSTANDING FEATURES OF THE NEW SUNBEAM FURNACE SERIES No. D-500

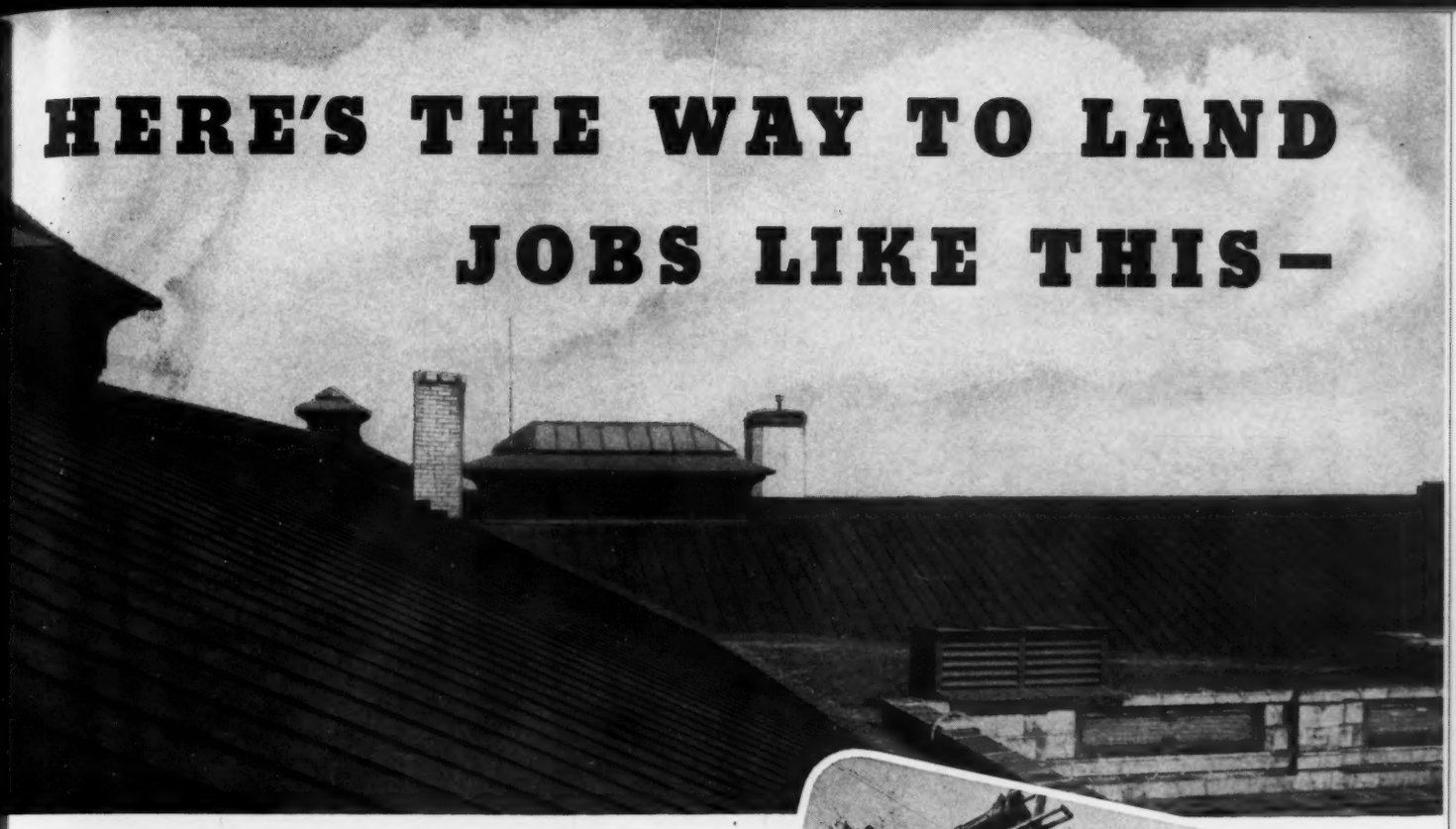
1. **Larger, more massive RADIATOR** for extra capacity. • 2. **New Duplex Grate** with center dumping feature. • 3. **Special Clinker Disposal Pouch** on stoker models. • 4. **Higher Ratings.**

AMERICAN RADIATOR & Standard Sanitary

New York **CORPORATION** *Pittsburgh*

Copyright 1941, American Radiator & Standard Sanitary Corporation

HERE'S THE WAY TO LAND JOBS LIKE THIS—



A 131-year-old product, Taylor Ternes, on the 31-year-old roof of Queen Anne High School, Seattle, Washington. The roof still is in excellent condition.

Big, profitable jobs are the kind you like to land—"naturals" for roofing ternes.

Proposals based on Republic Taylor Roofing Ternes instead of less durable, more costly materials, give *your* bid the edge. Taylor Ternes have given extra value in low first cost and minimum upkeep since 1810. Therefore, they are easy to sell to architects, contractors and owners.

Republic Taylor Ternes are copper-bearing steel coated with a lead-tin alloy. Every element is weather-resistant—long-lasting.

Available in sheets and rolls and with various weights of coating, including the best known of all brands—Target and Arrow.

The First Step Toward More and Better Roofing Business

If you want more work that will help build you good-will in your community, read all about Republic Taylor Roofing Ternes in Booklet 365—their advantages, where to use them, forms, sizes, gauges and coating weights with complete installation data.

WRITE FOR A COPY TODAY

REPUBLIC STEEL CORPORATION
General Offices; Cleveland, Ohio

BERGER MANUFACTURING DIVISION • CULVERT DIVISION • NILES STEEL PRODUCTS DIVISION
STEEL AND TUBES DIVISION • UNION DRAWN STEEL DIVISION • TRUSCON STEEL COMPANY

REPUBLIC STEEL
DEFENSE FOR AMERICA

REPUBLIC TAYLOR ROOFING TERNES

FLAT SHEETS—PAINTED OR UNPAINTED ROLLS—SIX WEIGHTS OF COATING TO SELECT FROM—AND TARGET AND ARROW BRAND

MEETING A 3-WAY DEMAND

Far be it from us to belittle the man who knows only one job, but does that so well folks will pay almost any price for his services. On the contrary, most of us wish we could get this kind of work, but not many do in the sheet metal industry.

Until quite recently, most shops handled only two classes of work—warm air heating and the installing of trough, pipe and similar outside jobs. But, as shop owners have seen an ever-increasing number of their customers installing asphalt or asbestos roofing and siding, they have realized here was an opportunity for additional business. That is why so many shop signs have been changed to read "Furnaces—Sheet Metal—and Roofing Work."

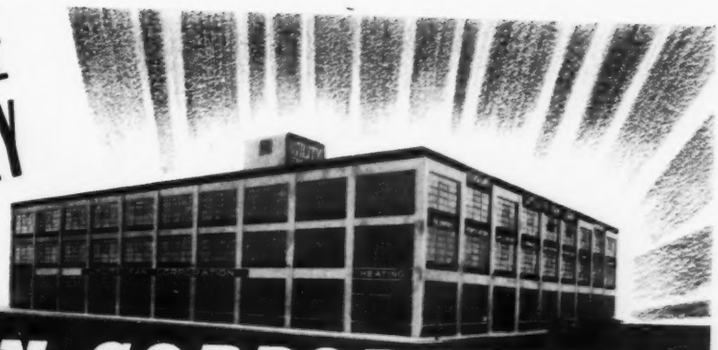
OSBORN stocks roofing and siding because it has been proved they offer an opportunity for profit to the trade. And because we do not do things half-way, you will find in this department everything a roofer uses. Whether you are meeting only one or all of your customers' Three-Way Demands—for heating, for sheet metal and for roofing—you will find OSBORN always ready to serve you.

ASPHALT ROLL ROOFINGS
ASPHALT ROOF COATINGS
ASPHALT ROOFING SHINGLES
ASPHALT SATURATED COTTON FABRIC
ASPHALT SIDING SHINGLES
ASBESTOS ROOFING AND SIDING
ASBESTOS ROOFING CEMENTS
ASBESTOS SHINGLE CEMENTS
ASBESTOS SHINGLE CUTTERS
BRICK-TYPE INSULATED SIDING
CAULKING GUNS AND COMPOUNDS
FELT (TAR SATURATED)
INSULATING PAPERS AND BOARDS
LADDERS AND LADDER JACKS
MOP YARN, HEADS AND HANDLES
NAILS
PAINTS—TINNERS'
ROOF BRACKETS
ROOFING CANVAS
ROOFING CEMENTS
ROOFING KNIVES
ROOFING PITCH AND ASPHALT
TARRED FELTS

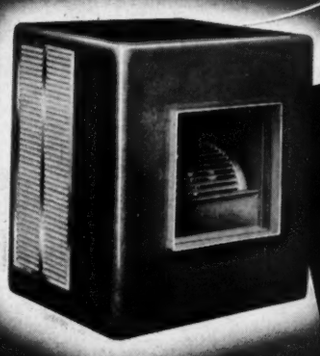
THE J. M. & L. A.
OSBORN Co
CLEVELAND, OHIO
BUFFALO • CINCINNATI • DETROIT
Distributors of Metals and Metal Products

A DEPENDABLE SOURCE OF SUPPLY FOR 82 YEARS

FOR A DEPENDABLE SOURCE OF SUPPLY



UTILITY FAN CORPORATION



UTILITY *Air* KOOLERS

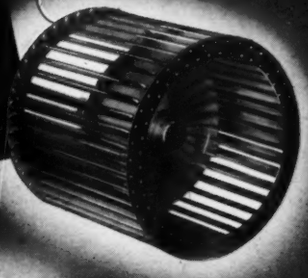
Evaporative coolers for residential, commercial and industrial buildings. Exclusive features include Uni-flowmeter (Pat. Pend.) for uniform water distribution, patented No-Sag cooling pads. 15 models.

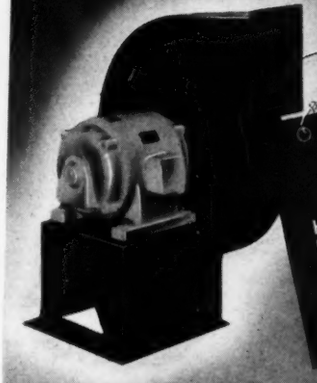
***Uni-Therm* FORCED AIR FURNACES**

Compact design...multiple-fin element with air-cooled hollow baffle... element guaranteed against burnout forever...automatic controls...filters ...built-in motor overload protection... full-floating blower and motor.

UTILITY BLOWER WHEELS

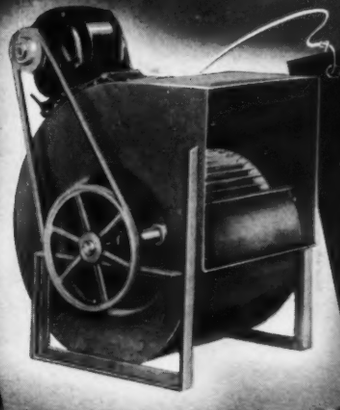
Forward curve multiple vane blower wheels ...greater output at slower rotative speeds... all machine made for absolute uniformity...dual hubs...dynamically and statically balanced.





INDUSTRIAL EXHAUSTERS

Complete line of Hi-Flow and Hi-Pressure types, of exceptionally high efficiency. Dynamically balanced...Randall self-lubricating pillow blocks, all-welded construction of high test steel. Corrosion-resistant surface available.



UTILITY BLOWERS

Complete line of standard and heavy duty multiple-vane centrifugal blowers. Wheel diameters 6 to 66", widths 6 to 66". Dynamically balanced...self-aligning Randall bearings ...die formed...electric welded...baked enamel finish.

Write Today For
COMPLETE CATALOGS on *UTILITY Equipment*

UTILITY FAN CORPORATION
4851 S. Alameda Street, Los Angeles, California

Please send me catalogs and prices on:

☐ Air Coolers ☐ Industrial Exhausters
☐ Uni-Therm Forced Air Furnaces
☐ Blowers ☐ Wheels ☐ Floor Furnaces

Name_____

Street_____

City_____ State_____

COOL IN SUMMER . . . WARM IN WINTER

QUIET THE YEAR ROUND

Specify Dynamically-Balanced

DELCO MOTORS

By specifying Delco motors for all heating and air-conditioning equipment, you can assure customers of quieter operation . . . complete satisfaction the year round. For all Delco motors are dynamically balanced to reduce vibration to a practical minimum and to safeguard against motor noises being transmitted through the house by ducts.

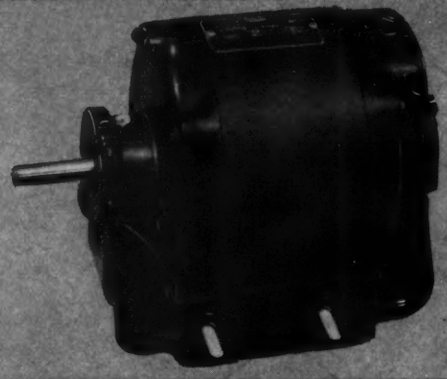
Dynamic-balancing is an example of the *extra* precautions which Delco Products takes to protect the motor user. Motor windings are carefully insulated and tested while separate from the frame; alignments are accurately maintained throughout production; and generous use of materials contributes to cool running and over-all ruggedness. Consult the Delco Products Engineering Department for recommendations.

Check These Features, Too

Delco Centrifugal Switch for positive, snap-action starting—no "fluttering" when motor goes into operation.

Delco Thermotron for complete overload and overheating protection—listed by Underwriters.

Delco End-Play Take-up Device for quieter operation on V-belt drives.

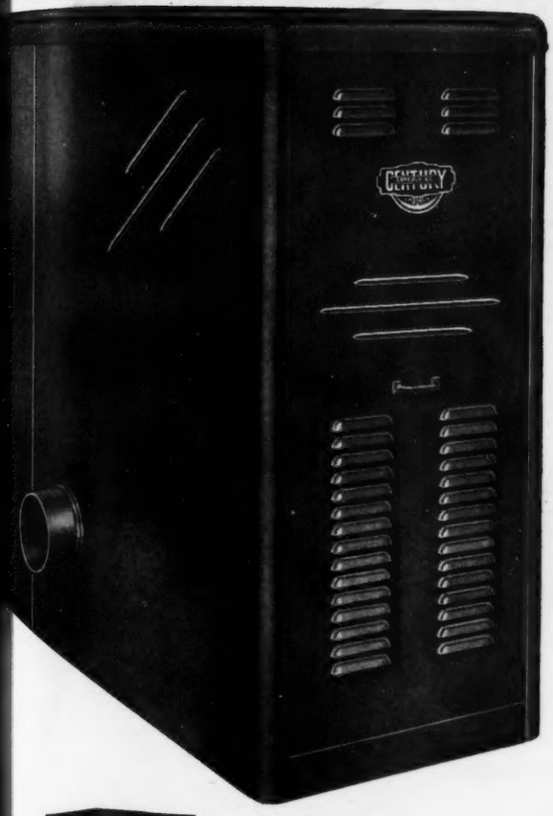


DELCO MOTORS

DIVISION OF GENERAL DELCO PRODUCTS DAYTON, OHIO MOTORS CORPORATION

AN OIL HEAT Sensation!

CENTURY "NEW MODEL R" CRESCENT UNIT



Amazing New Features . . . for easy Selling!

- **HIGH EFFICIENCY . . . . YES!**
- **PULSATION PROBLEM . . . . . NO!**
- **CARBONIZED NOZZLE . . . . . NO!**

They said it couldn't be done, but here it is . . . a new Century unit *with primary and secondary heating surfaces combined in one integral unit.* And it is priced low to make faster sales and better profits for you.

This new Model R "Crescent" antiquates the old "Fire travel bottlenecks," banishing forever pulsation and consequent loss of efficiency. The "Crescent" fire travel is long and free to assure maximum utilization of the hot gases. There is no maze of baffles . . . no complicated zig-zag course to the flue. Fifty square feet of prime heating surface per gallon of fuel, in all models.

Another Century "First" is the exclusive new Stainless Steel Combustion Chamber with inbuilt secondary air supply. This revolutionary development prevents carbonization of the nozzle and electrodes . . . a common source of service calls and expense in conventional type units.

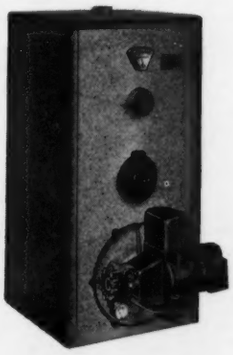
Exhaustive tests prove that the new Model R "Crescent" sets a new high standard of efficiency. Available in seven sizes, 75,000 to 350,000 B.T.U. So, in every respect it is packed with profit possibilities for you. Let the Century "Crescent" help make you the oil heat leader in your territory.

A Complete Line From One Source

High-Boy — 60,000 to 100,000 B. T. U. forced air domestic units. HB 60; 60,000 B. T. U. low priced competitive unit. HB 75 to HB 100; 75,000 to 100,000 B. T. U. High-Boy Crescent units. Large industrial sizes on specification.

SW Series oil fired Flueless Boiler unit available in 4 sizes in closed or open models. For steam or hot water systems.

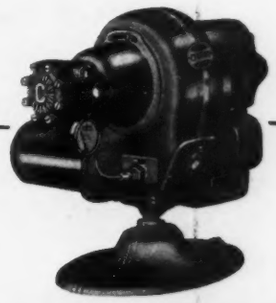
Type WR 399 oil fired Hot Water Boiler Unit. 584 sq. ft. radiation load at 150° water temperature. Compact, highly efficient, priced low.



Aqua-Master oil fired Water heater available in 2 sizes. W-150; 150 gal. per hr. at 80° rise. W-200; 200 gal. per hr. at 80° rise.

Write or wire today for complete details and Free literature. See the new "Crescent" and the complete Century line on display — space 229-231-233, national Oil Burner Progress Exhibition in Philadelphia, March 17-22.

Century Water Softeners (not illustrated) available in 3 sizes from 22,000 to 44,000 grains. Zeolite type. Send for descriptive literature.



New Model L Century Conversion Burner. New efficiency, new simplicity, new compact design. Available in 4 sizes, 1 to 25 gal. nozzle. This is the burner, in flange mounted model, used on new "Crescent" line.

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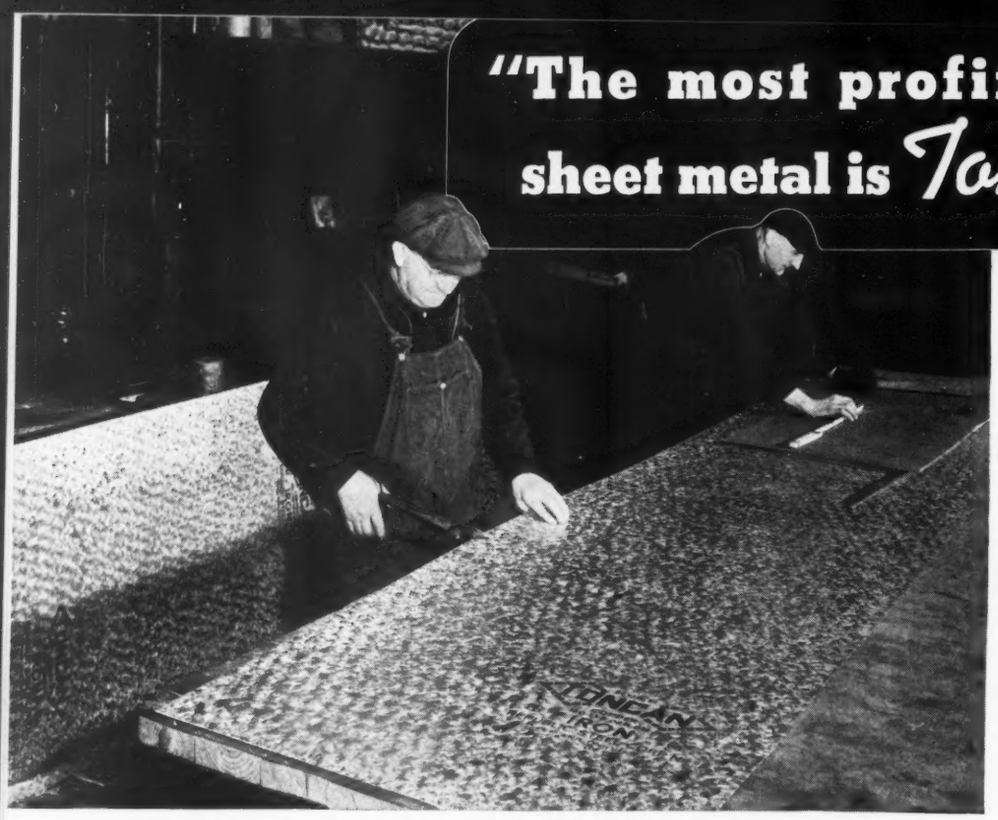
"The most profitable buy in sheet metal is *Toncan Iron*—"



These are the words of Mr. Fred Christen of Fred Christen and Sons Co., Toledo, Ohio, after 44 years in the Sheet Metal Contracting business —after watching his organization grow from a one-man shop to a plant now employing 140 persons, the largest sheet metal firm in Toledo. In further explanation he says—

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"Through the years, our experience with sheet metal has proved to our satisfaction that the best buy in sheet metal is Toncan* Iron. We know that it lasts longer, forms easier and—what is most important—costs less in the long run.

"Actually the added first cost of Toncan Iron is only slight. On the average job it amounts to only a few cents and, even on a big job, never more than a few dollars.

"Approximately 75% of the cost on any job is labor, regardless of what material is used. We see no reason why we shouldn't furnish the best that money will buy since the difference in the total figure is so slight.

"For eaves trough, conductor pipe, roofing and siding, we always install Toncan Iron. On other applications, we submit cost figures with the notation that the best investment is Toncan Iron. And because of our size and our reputation, customers rely upon us for a sound recommendation.

"I have been using this metal with the green stencil since it was first offered to the trade about 32 years ago. In fact, I believe I was the first to use Toncan Iron in Toledo. My first installation was trough and conductor pipe on a residence. The building is still standing and the Toncan Iron is still intact. That's a pretty good record and that's one reason why we do not hesitate to tell customers that under ordinary conditions, this alloy iron will last a minimum of 20 years.

"Our most recent Toncan Iron installation was the air-conditioning system of the new Toledo Public Library, for which we fabricated 80,000 pounds of sheets into ducts.

"So if you will take the advice of a veteran tinner, use Toncan Iron. I have found that the combination of quality work and quality material leads customers to say something like this . . .

"Call in Fred Christen. You can always depend upon him for a good job."

". . . and after all, that's what makes any business thrive."

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Vol. 110 American Artisan No. 3

Overhead—Be Sure You Recover It

AT the Wisconsin convention (see report of the meeting in this issue) an interesting discussion of overhead disclosed that a great many contractors seemingly have not given enough consideration to this very important factor in obtaining profits from the "good times" the industry is now enjoying.

The speaker very properly pointed out that the method of applying overhead is not as important as the problem of being sure that sufficient overhead is included in every proposal or selling price offered.

The method of applying overhead should be a decision based upon individual bookkeeping convenience. Overhead may be applied as a set percentage of productive labor, or it may be percentages added to both material and labor. Which method you use depends upon how much time and detail you wish to enter into in keeping your records.

Overhead on Productive Labor

Probably the simplest method of applying overhead is by a percentage on productive labor. Suppose a job requires a labor cost for two men at $1.25 per hour working ten hours each. The labor cost is then $22.50. How much overhead should be added?

The overhead will vary, of course, depending on how much is spent for rent, telephone, light, bookkeeping, advertising, etc., but the Philadelphia association has found, we recall, that 100 per cent for overhead on productive labor is a pretty general figure. With overhead costing 100 per cent of productive labor our $22.50 becomes $45.00 to which must be added cost of material, material profit and perhaps a selling profit if bookkeeping is so arranged.

One hundred per cent on productive labor as an overhead cost may seem high to contractors who have not itemized their overhead carefully, but in Philadelphia, where the association has offered a bookkeeping service to members for many years, this 100 per cent for overhead is not the high limit—many job shops show overheads quite a bit higher.

Some may say, as they did in Wisconsin, that it's alright to "bookkeep" at 100 per cent on productive labor but—"try and get it." This assertion is true, of course, in many instances. But if you can't recover your overhead expense—how can you continue in business and make money? If you reduce your true overhead cost you are reducing your profits (if any); you are cutting out some of your salary; you are doing work at less than true cost; you are letting yourself in for "token payments" on overdue bills; you are, in short, making it easy for yourself to go out of business.

To draw a salary; to get a profit; to stay in business—you must get back in your selling prices all of your actual costs.

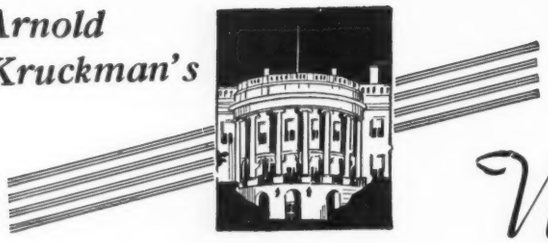
Overhead on Material and Labor

If the work your shop does is such that overhead on productive labor does not reflect a true overhead cost—overhead on both material and labor is the better method. An example of this could be the business where a large portion of sales are on items sold without any, or very little, labor attached. You can't reasonably apply a productive labor overhead percentage high enough to recover your overhead costs in such operations, so the material or items must carry an overhead percentage which reflects your costs of buying, handling, selling, installing these items.

The key to proper selection of overhead percentages and to a decision on how to apply overhead lies in an analysis of what you did last year or part of last year. Overhead costs for a pe-

(*Continued on page* 138)

Arnold Kruckman's



Washington Letter

Procurement's Bulk Buying of Furnaces

WE are getting the habit so naturally here in Washington that when a friend asks what time it is we pull our hats over our eyes, tip-toe to the doors, glance furtively all around, and whisper: "Two o'clock!"

Such melodrama is an inevitable part of the War fever. Hush-hush, finger-printing, "mugging", and all the rest of it builds up the atmosphere. So don't blame the Procurement people for holding out on the prices and the details of their mass-buying. Bureau government never likes to give out information, and government under the complex pressures of this present abnormal situation jumps when any one says boo.

Program Just Starting

Sometime ago, however, Director Mack's Procurement Division announced that it was buying up to 25,000 units of the items required for interior installation in defense housing. These items included warm air furnaces, bath tubs, space heaters, refrigerators, kitchen sinks, cooking stoves, hot water heaters, etc. Federal Housing Administrator C. F. Palmer recently stated that Procurement already has purchased 17 types of items to a gross total of 458,000 articles for installation in 28,000 housing units which have cost the Government approximately $5,000,000.

Some Furnace Prices

Mr. Palmer did not say so, but it is a fact, that something over 3,000 warm air furnaces were among these bulk purchases. The Government paid $49.38 each for coal-fired, warm air furnaces with blowers; and it paid $52.48 each for coal-fired, warm air furnaces with blowers with automatic blower controls. The specifications for these furnaces and accessories were outlined in these columns in February. Procurement also bought a substantial number of oil-fired, air conditioning furnaces with pressure type blowers and controls, for which Government paid $110 each. The purchases included a limited number of gas-fired, air conditioning furnaces with pressure type blowers and controls. But both the oil and gas furnaces are relatively insignificant in number.

Hand Fired, F. A. Favored

To all intents and purposes the Army housing has a blanket requirement for coal-fired furnaces. This first batch of orders for heating plants is supposed to total roughly 10,000 furnaces when the contracts are all placed.

These furnaces, like other equipment purchased in bulk by Procurement, will almost wholly be used in the defense housing units built by Public Buildings Administration in behalf of the Army. This means they will be used in each State where the Army either builds a military community, or expands an existing community, or sponsors the construction of a defense plant and its embroidery of defense housing. These projects are located as itemized in the February issue. Up to date there is under contract a total of 47,551 units. At the very least 70,000 more units must be constructed as fast as they can be built.

How Much Housing? No One Knows

No one knows exactly how much defense housing must eventually be built. But the pressure at the moment is so great that Congress has provided another $150,000,000 which will build an additional 50,000 units. And we hear here in Washington persistent suggestions that the Army of 1,400,000 must gradually be expanded to 4,000,000. With this expansion there will come a supporting increase in defense industrial plants. We now have either in operation or in process of construction plants which have cost the Government $1,200,000,000. They say that the additional plants will cost at least another $500,000,000—not including the housing.

G. C. Is "Queen Bee"

Under this system of bulk buying, the furnaces will be stored at some central point until the general contractor is ready to install them in the particular local project where they may be needed. Then, upon requisition by the Construction Quartermaster on the job, the necessary number of furnaces are shipped. The general contractor puts up the houses on a cost-plus-a-fixed-fee basis. If he convinces the QM in charge that he can save money by installing the furnaces, purchasing the needed materials and by hiring the skilled help, it will be done that way. Otherwise the installation will be subcontracted to competent persons who furnish the services and the necessary additional materials. If the installation is done as a subcontract, the warm air heating contractor bids on the cost-plus-a-fixed-fee basis, this fixed fee being 10% of the cost of doing the job and supplying the essential additional materials. In all instances the Government is the employer and pays the bills.

Army Says: "Let G. C. Handle"

There has been a tendency on the part of the Army to turn the whole problem over to the general contractor, to regard him as the agent for the Army. This has naturally led to the obvious system under which the general contractor installs the equipment by day labor and collects the profit himself. But

this is contrary to the habit and custom of the Public Buildings Administration. PBA for many years has been building the Federal structures around the country and has been doing a grand job, sound in principle and sound in the economic distribution of the benefits and in securing fine buildings at reasonable cost to the taxpayers.

PBA has been uncomfortable in operating under the Army system; and, in addition, from everywhere, subcontractors and others have been making life weary for OPM Chairman William S. Knudsen with vigorous protests against the elimination of the subcontractor. It was bad enough to lose the legitimate profit in furnishing the equipment; but to be reduced to a basis of day labor was the last straw. The fight has not yet been settled; but it is obvious Knudsen and others will adjust the difficulty in some manner to give the subcontractor a break.

Navy Favors Subcontractors

The Navy always subcontracts this type of work. In fact the Navy, which is the largest single builder of defense housing in the United States, declines to bulk buy the interior equipment through Procurement or in any other way. Navy secures it in the usual way by bid, and the job of installation is let to subcontractors in the orthodox manner by awarding overall contracts for equipment, materials and installation, on cost-plus-a-fixed-fee basis. The deal is usually made locally by the general contractor, or by the regional office of the Bureau of Supplies and Accounts. In some rare instances the negotiations are conducted from Washington.

Navy's doughty opposition to mass buying stems from the first World War. They discovered at that time that central storage was a serious problem. Furthermore stored equipment was misplaced or lost. Transportation tangles and other confusions added to the difficulties. Often it was impossible to adapt equipment bought at one time to building specifications drafted later. The saving shaved by mass buying was more than offset by the inevitable waste of handling and distribution and changes in plan that are inseparable from Government transactions.

Some Plumbers' Headaches

The mass buying program has caused particular distress among the people of the plumbing and heating industry. As it now operates, the wholesaler, the jobber, and generally, the local plumbing and heating contractor, have no opportunity to bid. When the specifications for bath tubs, for example, were issued by Procurement, the big orthodox manufacturerers of standard appliances found themselves between the wholesaler-jobber-contractor on one side, and the Government on the other. It was obvious that whatever step they took it would be unpopular with some important element in their cosmos. Finally they apparently came to the conclusion that Government moods and methods change, but that the wholesaler and jobber and local contractor are the foundations of their system. They threw their lot with the latter. They declined to bid.

The contracts thus went to manufacturers who are the backlogs of the supplies for the mail order establishments. One manufacturer, virtually new to this phase of the business, supplied upwards of 3,000 steel bath tubs, 5′, recess, 14 gauge steel, apron 16-gauge, coated with porcelain enamel, conforming to Bureau of Standards specifications, for $17 each. Another supplied more for $22 each. It is reported the first manufacturer frankly said it cost more to make the bath tubs than the unit price. The deal was regarded as an experiment; and it was assumed future business might equalize current losses, which were charged off to patriotism and to the hope of future favors.

Housing Sorely Needed

These regimented furnaces and bath tubs have already caused construction difficulties. Mrs. Roosevelt has become deeply concerned with the desperate housing needs in many defense communities. She convinced Defense Housing Administrator Palmer that the time factor might be solved by using prefabricated demountable houses. Somewhere between 1,500 and 2,000 shelters each are urgently needed at Indian Head, Md.; Vallejo, Calif.; New London, Conn.; Havre de Grace, Md.; Long Branch, N. J.; and Savannah, Ill.

Prefabricated—Not Demountable

After a month or more of maneuvering by the Palmer office and the manufacturers, the patience of FWA Administrator Carmody wore thin. He called the prefabricators to a meeting, expecting about 20 firms. Over 100 persons appeared on behalf of more than 50 companies. The prefabricators were eager and sincere. But they flinched at the demountable feature. And they were reluctant to bind themselves to utilize the bulk-bought bath tubs, furnaces, sinks, w. c., and other interior equipment assembled by Procurement. It was finally determined that they might use equipment they find most adaptable, so long as it conforms to Government specifications. But Carmody insisted that taking the house down is just as important as putting it up.

Even Ships for Housing

The need for speed was emphasized by the fact that Congress will give Defense Housing Administrator Palmer $6,750,000 to buy auto-trailers and ships. On leased or purchased land it is planned to install sanitary equipment, and to create huge auto camps where Government workers may live in Government-owned trailers. In other places, along the waterways of California, the Gulf Coast, the Atlantic Coast and on interior streams and lakes, the Administrator will buy large ships with many staterooms. In California, for instance, he is buying a ship with 500 staterooms which will room from 500 to 1,000 men. There are to be 5 or 6 such housing ships.

This letter probably can be most usefully brought to a close by mentioning Lt.-Comdr. Ivan Bickelhaupt. He is the Navy man who has charge of the construction of all Navy defense housing. You will find him in Washington when he is not out on the job. Bickelhaupt is a Naval Reserve officer. In civil life he is executive secretary of the Eastern Division of the National Glass Distributors Association. He knows the problems of the contractor and construction man from the ground up. He talks industry language. He knows how to do the job, he is reasonable, he is fair, and he is impatient of red tape and swank. They tell you here that two or three more Bickelhaupts in the Government might solve many bothersome problems that bewilder the willing, well-meaning, but starry-eyed academicians who are too frequently on the job. If you have a real problem connected with Navy housing, telephone, write or come to see this man Bickelhaupt.

Proprietorship, Partnership or Corporation?

By Ross Dudley

THE president of the construction company perplexedly looked at the discouraged balance sheet on his desk, then at the vice president seated on the other side of the furniture.

"I wonder if we ought to disincorporate?" he slowly inquired. "The payroll taxes around here cost us plenty. We'd at least save what we're paying on your salary and mine, and on any of the other boys that we might take into partnership. What do you think?"

"I dunno," the other shook his head, "but it'll soon be the first of the year and might be worth looking into."

With business taxes having soared to stratosphere heights and going higher and with the red ink hovering over many balance sheets, one of the financial headaches of today's businessman, is the problem of determining the most advantageous form under which to conduct his business: proprietorship, partnership or corporation? And with most concerns keeping books on a calendar year basis, the beginning of 1941 offers an opportune time for making any desired change.

Selecting the form of a business is something like getting married. Should you marry the first girl because of her agreeable disposition; the second because of her looks, or the third because of her rich father? What you do, depends on what you desire most, for there are advantages and disadvantages each way.

Proprietorship Is Cheapest

From the viewpoint of pure economy, it is cheaper for the small or medium-sized business to operate as a proprietorship (i.e. for the individual to be the sole owner), or as a partnership, than as a corporation because:

The payroll taxes alone may be a few hundred dollars a year less on the unincorporated business than they would be on the same business if incorporated.

Generally speaking, payroll taxes, that is, state and federal unemployment insurance, federal old age pension and state workmen's compensation, amount to from five to ten per cent of the payroll. While the total payroll taxes may vary in different states and as to various-size businesses and in different industries, particularly as to workmen's compensation, the substantial percentage will come within the five and ten per cent, and most of the remainder won't be very far away.

The big difference between taxation on a corporation and a partnership or proprietorship as to payroll taxes is this:

As the corporation is a separate and distinct legal entity, entirely apart from its officers and stockholders, the officers and stockholders working for it are, in legal effect, employees, even though they may own all of the stock of the corporation. Therefore payroll taxes must be paid on their salaries drawn from the corporation.

How to Avoid Payroll Taxes

With a proprietorship or partnership, the proprietor or partners are the concern and therefore the employer, hence payroll taxes do not have to be paid on their salaries.

To illustrate:

Jones, Smith and Brown are a partnership, doing business under the trade name of Jones, Smith & Brown Company and their salaries total $7,500 per year. They do not have to pay payroll taxes on their salaries. But if Jones, Smith & Brown Company was a corporation, even though the same three owned all of the stock and the corporation paid them the same $7,500, the payroll taxes applicable to that particular company would have to be paid on their salaries, as they would be employees of the corporation. Ordinarily this would be between the five per cent, amounting to $375, and the ten per cent of $750; the exact amount to be paid by any business of course being a matter of actual computation under applicable federal and state statutes.

And there are additional corporation taxes to be paid by even a small corporation that are not encountered by the unincorporated business, to say nothing of the expense of more numerous and complicated corporation reports to be made, and considerably higher income taxes if a profit is made.

So, over a period of ten or fifteen years, the savings of a few hundred dollars per year by the unincorporated business might mean the purchase price of several new automobiles.

Does that mean that the incorporated business is simply throwing away enough money to buy several new automobiles?

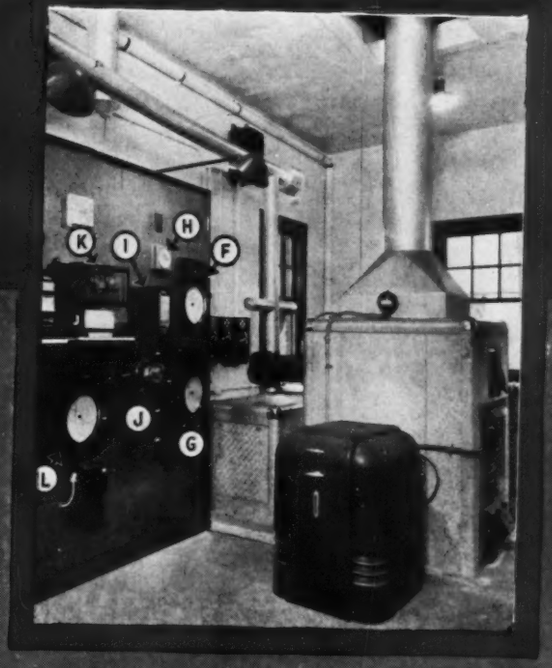
No. Like the fellow who chose the girl with the beauty instead of the agreeable disposition, there are certain advantages to the corporation expense:

(*Continued on page* 128)

AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING

SECTION



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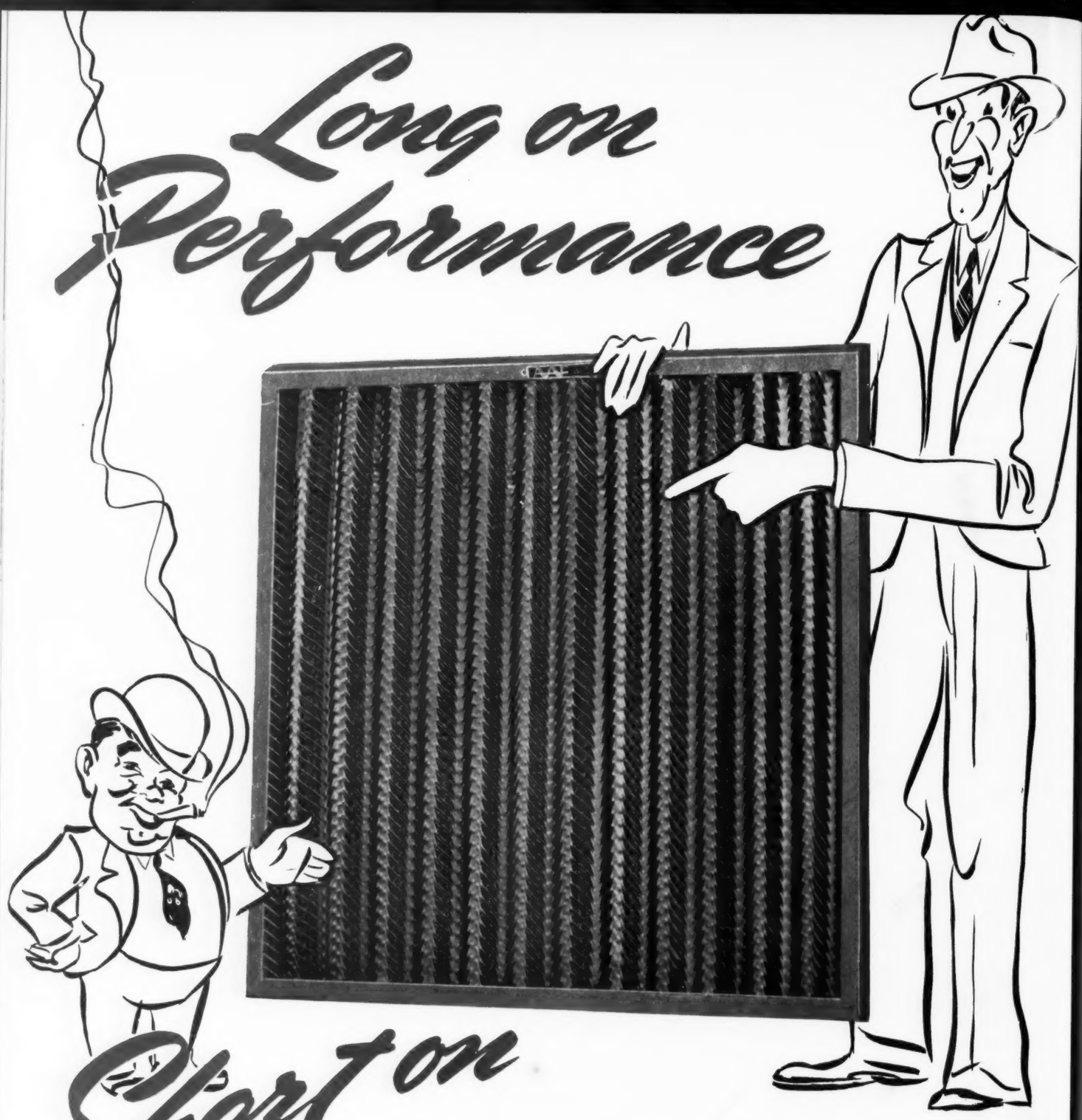

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AUTOMATIC CONTROLS

For Forced Air Heating Systems

[Part 3]

By S. Konzo

Special Research Assistant Professor,
Engineering Experiment Station, University of Illinois

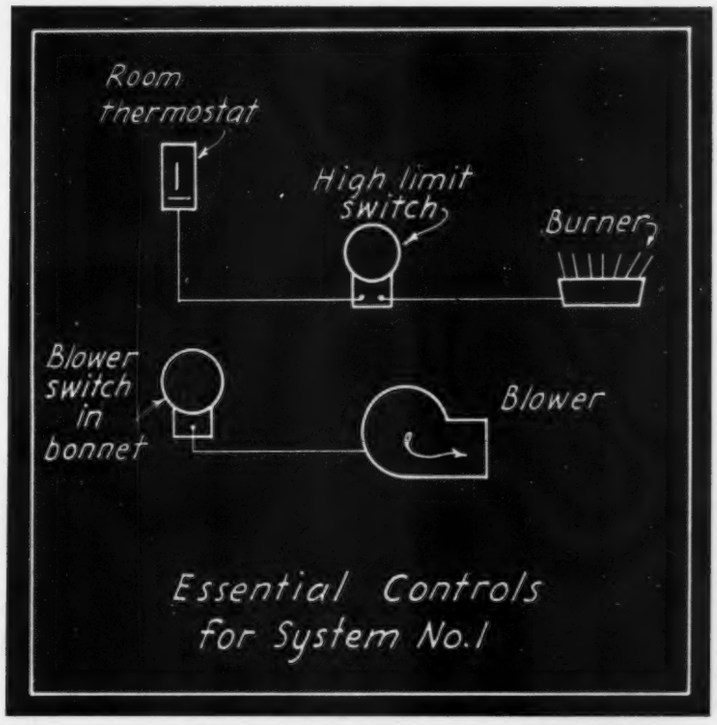


Fig. 1—The basic forced air control system in simplified diagram. All additional instruments are only safeguards or refinements, or economizers. In this system the thermostat starts and stops the fire, the fan switch starts and stops the fan.

Part 1 of this discussion appeared in the January issue; Part 2 in February. The author seeks to show that there are only two basic control systems—but many modifications and variations created by the use of modern instruments. These modifications serve only, however, to protect or refine the operation of the heating plant.

Design Bonnet Temperatures and Settings

QUESTION 38.—If I understand you correctly up to this point, if I design a given plant on the basis of the bonnet temperature being 165 deg., I can still obtain a wide variation in operating results depending upon how I set the controls. Is that right?

ANSWER 38.—Absolutely right. Very few heating men realize that when they use a design bonnet temperature of say 165 deg., that they are merely settling on some basis for calculating the air volume requirements for each room under maximum design load.

Once that is done they have available a very wide choice in deciding how to make the plant operate. The manner in which the plant will operate depends to a great extent upon the setting of the bonnet thermostat or blower switch. Time and again we have said that the forced-air heating system is about the most flexible type of heating system we have. This illustration, of the effect of the setting of the bonnet thermostat on the operation of the plant, demonstrates that you can make the plant do almost anything you want, and still give satisfactory operation over a very wide range of adjustments, if you know what you are doing.

QUESTION 39.—If I design a plant for 165 deg. bonnet temperature and set the blower switch indicator to give an average bonnet air temperature of 165 deg., how will the plant operate during various indoor-outdoor temperature differences?

ANSWER 39.—First let us assume that the actual heat losses are the same as those estimated by the calculations. Then assume that the plant efficiency is equal to that assumed in the design calculations. In this case, the blower would operate intermittently for all weather conditions except that corresponding to maximum design load, when the blower would be operating continuously. For instance, if the design temperature difference from indoors to outdoors is 80 deg. F., then for 20, 40, and 60 deg. differences from indoors to outdoors, the blower would be operating about 25%, 50%, and 75% of the time. That is, the blower would be operating intermittently, but the total hours of blower operation would be 25%, 50%, and 75% of the 24-hour period.

QUESTION 40.—If the design bonnet temperature is 165 deg. but the blower switch setting is 135

deg. F., would the percentages of blower operation increase over the values you just stated?

ANSWER 40.—Yes. The bonnet switch indicator could be set low enough so that the blower operated continuously whenever the weather became colder than say 25 deg., or any other temperature warmer than the design temperature.

QUESTION 41.—If I set the bonnet switch at 135 deg., although the design bonnet temperature was assumed as 165 deg., does that means that the plant would not heat in extremely cold weather, unless I raise the bonnet switch setting to 165 deg.?

ANSWER 41.—Not at all. Just suppose that under the conditions which you mention that the fan operates continuously when the outdoor is about 25 deg. Then it would keep on operating continuously for all weather conditions that are colder, but the actual operating bonnet air temperature would rise above 135 deg. Finally, when the design outdoor temperature of minus ten deg. was reached, the fan would be operating continuously and the actual bonnet air temperature would reach 165 deg.

There is an added factor that enters the picture at this point, and it is explained in detail in the book, "Winter Air Conditioning," but I won't go into it here for fear of confusing you.

QUESTION 42.—Briefly summarizing this phase of the discussion, I infer that you are in favor of using low settings of the indicator on the bonnet thermostat, or blower switch, but not so low as to cause drafts in the living quarters. Is that right?

ANSWER 42.—Absolutely right. There is one other point that has not been brought out in our discussion, which I would like to elaborate upon at some other time. Most heating contractors seem to take it for granted that when a heating plant has been balanced to provide equal distribution of temperatures in all of the rooms of the house, that no changes will be necessary in the balancing of the room temperatures when the setting of the bonnet thermostat is changed. This is not the case. Every time the setting of the bonnet switch is changed, theoretically at least, the dampering of the ducts will have to be changed. [*Editor's Note: A further discussion of this interesting point will be taken up in a later article.*]

Handling of Controls

QUESTION 43.—In view of the importance of the setting of the bonnet thermostat on the proper functioning of the heating plant, I begin to see why you do not want the home owner to be "messing" around the bonnet thermostat and changing the settings. Is that the reason?

ANSWER 43.—We think it is reason enough. In this connection some bonnet thermostats are built so that the indicators cannot be moved except by unlocking the cover and releasing a lock screw. That is not a bad idea. In addition, the placing of the thermostats inside of the casing does discourage illegitimate tampering to some extent.

QUESTION 44.—I have known of a case or two where the installer wanted the thermostat to regulate the bonnet temperatures at a higher range than was indicated on the setting scale,

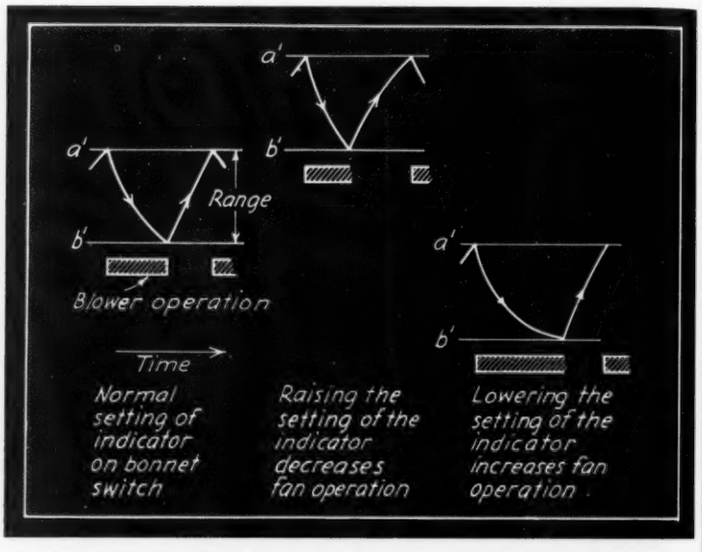


Fig. 5—Raising and lowering the temperature at which the fan starts results in shorter and longer fan operations. As in Fig. 4, too high and too low settings can be objectionable (see text).

and twisted the thermostat helix by hand until it was sprung a bit. What do you think of that stunt?

ANSWER 44.—If there is any twisting to be done it ought to be the neck of the man who does it.

QUESTION 45.—What conditions would make an installer do such a stunt?

ANSWER 45.—I imagine that one condition which might lead him to such brutal action is that resulting from radiation from heated surfaces affecting the thermal element of the thermostat.

Radiation Effect on Bonnet Thermostat

QUESTION 46.—Do you mean that if the bonnet thermostat is set at 165 deg. that under certain conditions it may operate at say 150 deg. instead of 165 deg?

ANSWER 46.—Yes. If the thermal element, the part extending into the air stream, is exposed to direct radiation from high temperature heating surfaces, the heat radiating from the surfaces may heat the element so that its temperature is greater than the surrounding air temperature. The net effect on the controls

will be the same as that of an incorrect calibration of the instrument.

QUESTION 47.—Why does not the control manufacturer take this radiation effect into account and compensate for it in the original calibration?

ANSWER 47.—There exists such a wide variation in practice in the exposures which the thermal elements have to encounter that no single compensation would work for all cases. The only practical solution is to place the thermal element so that it will not be exposed to large areas of heated surfaces, or to shield it with a radiation shield placed between the element and the heated surfaces. Another solution would be to measure the air temperature in the bonnet just as the thermostat turns on or off the burner, and make a correction to the scale reading. To tell the truth I don't see why it should be necessary to do this except on rare occasions.

QUESTION 48.—Could not the thermostat scale be wrongly calibrated?

ANSWER 48.—The thermostat calibration could be in error if the instrument was improperly handled during shipment or during installation. If the controls are made by a manufacturer who checks his product, the control instruments leave the factory properly calibrated.

QUESTION 49.—I begin to see that I may have been a bit rough in handling control instruments. They are a bit temperamental aren't they?

ANSWER 49.—On the contrary, the controls for forced-air heating systems are relatively simple and as a rule quite rugged. During a lifetime of service they take much service abuse consisting of countless thousands of temperature cycles. However, they are very poor substitutes for a football.

Maximum Bonnet Temperatures

QUESTION 50.—What would you consider as a reasonable upper limit for bonnet air temperatures?

ANSWER 50.—About 175 deg. would be about a reasonable upper limit for most systems. I am referring now to the working temperature, or the temperature at which the blower turns on.

QUESTION 51.—What about the upper limit temperature for the high limit switch setting?

ANSWER 51.—200 deg. should be about the upper limit for a high limit switch. If I were a homeowner I think I would be inclined to stay well below 200 deg. It would be safer. Personally, I don't see much sense in some codes and ordinances which allow this upper limit for the high limit switch to be as high as 250 or 300 deg. That would be equivalent to allowing the use of a coin, instead of a regulation fuse, in the fuse box.

QUESTION 52.—Under what conditions would one use bonnet air temperatures of the order of magnitude of 175 deg. or higher?

ANSWER 52.—There may be two reasons why some designers would want to specify bonnet temperatures higher than normal.

The first is that if high temperatures are used, a relatively smaller air volume is required.

The second reason is that in the case of exceedingly long duct systems, a large temperature drop may occur from the bonnet to the register, which would require a high temperature at the bonnet in order to insure a register temperature that would not cause drafts. For example, let us suppose that the total length of a duct from bonnet to register is 150 feet. Assuming about 0.5 deg. temperature drop for each foot of duct, the total temperature drop from bonnet to register would be 75 deg. If the register air temperature must not be less than 110 deg. then the bonnet temperature would have to be 110 plus 75 or 185 deg.

QUESTION 53.—Would it not be good practice to adequately insulate this run, reduce the temperature drop, and thus avoid the necessity of using such high bonnet temperatures?

ANSWER 53.—Yes. Adequate insulation of the duct would reduce the temperature drop and at the same time reduce the quantity of air required to heat the particular room.

QUESTION 54.—One more question and I am done. I have known of a case or two where the home owner shuts off the main switch on the blower by hand, but allowed the burner to operate from the room thermostat.

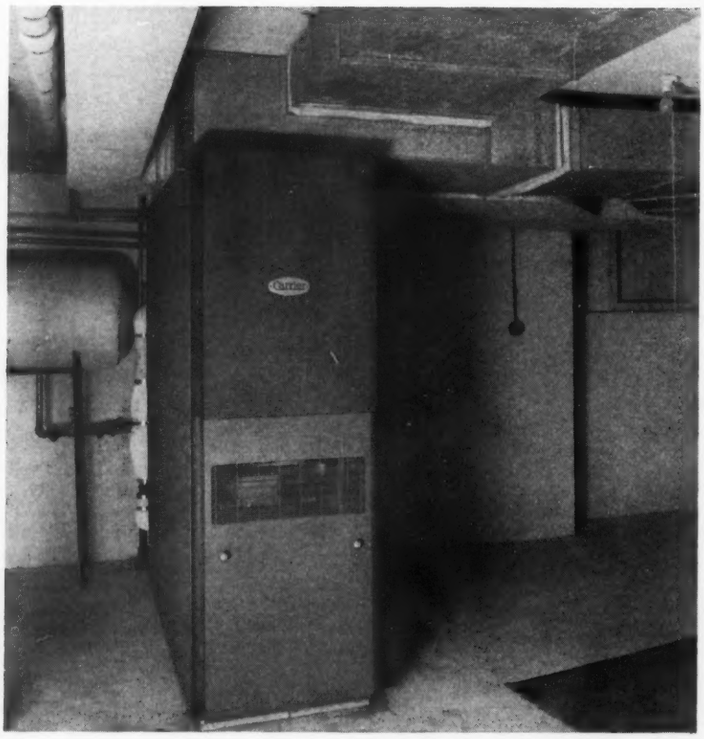
I have also seen a skinflint job in which the installer did not use a blower switch at all, but only a room thermostat to operate the burner. What do you think about these jobs?

ANSWER 54.—Both cases belong in the category of abominable practice. The complete automatic control system is as necessary to a forced-air heating system as the nervous system is to the human body.

When the home owner shuts off the main switch on the blower by hand, he runs a danger of shortening the life of the equipment. The best way to prevent this is to wire the controls so that when a fuse blows or when the knife switch is opened manually, the burner cannot operate. In other words, the knife switch should control both the burner and the blower and not the blower alone.

For the second case in which the bonnet

(*Continued on page* 134)



Profit—Not Volume

Is the key to financial health in Air Conditioning

By R. C. Nason

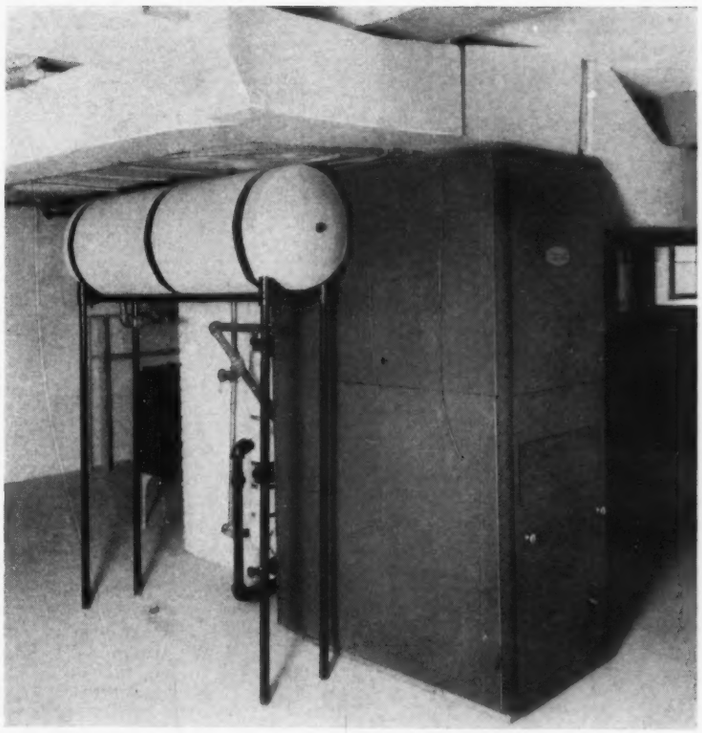
IT is the expressed opinion of Arnold Rose, manager, Suburban Air Conditioning Corp., White Plains, N. Y., based on more than a decade of experience, that the basis of a heating concern's sound financial health must be profit instead of volume.

Price-Per-Opening Gets only "Tough" Jobs

Failure to acquire satisfactory profit, also in Mr. Rose's opinion, usually occurs by cost estimating on a price-per-opening basis, which he feels is an unsound method in the majority of instances. The Suburban company used to employ this method, but found that they too often secured complex orders which proved unprofitable and lost many simple orders wherein profit could have been earned. This caused them to substitute what appears to be a sounder method wherein every outlet is classed for estimating purposes as "simple," "medium" or "difficult." The latter two classes, of course, force higher costing than the first.

Though familiar to the average sheet metal contractor who seeks air conditioning work, some of the obstacles encountered that force high costing bear repeating. Here are a few: failure of partitions to line up on different floors; shallow and extra close studdings; soil pipes in places

On facing page—Typical Suburban installation in which thoughtful planning and installation neatness are stressed to retain customer good will. On facing page, below—Suburban solved this difficult hall with a low supply (left) and a return (right), plus sufficient air turnover to eliminate temperature stratification. At right—Another house installation with all ductwork insulated.



where ducts should be run; obstructions that make numerous offsets and extra elbows necessary; partially excavated foundations; cramped working spaces which add to labor time; use of scaffolding. The foregoing, plus other profit-robbing factors cause loss to sheet metal contractors who fail to consider them in cost-pricing. Estimators who price on cost-per-opening basis usually do not consider "difficult" conditions.

Important as the previously cited conditions are in influencing air conditioning merchandising success, it is the experience of the Suburban Air Conditioning Corp. that good dealership consists of sound organization, planned merchandising, adequate engineering, detailed cost accounting—all working together like a well-oiled machine. By this is meant that good management and good engineering must march together.

Suburban's Salesmen's Policy

One element of good management may be the recruiting of a good sales staff. In the case of the dealer here discussed, all of an average of 10 outside salesmen are either graduate engineers or experienced in heating, ventilating, air conditioning, refrigeration and related subjects such as humidifying and dehumidifying.

Salesmen price their own projects, make up their proposals and sell them. An important part of the survey is the drawing of sketches of basement, first and all higher floors, to show locations of partitions, size, shape, obstructions, plus other critical factors. Such drawings are filed with other papers pertaining to all projected and completed orders.

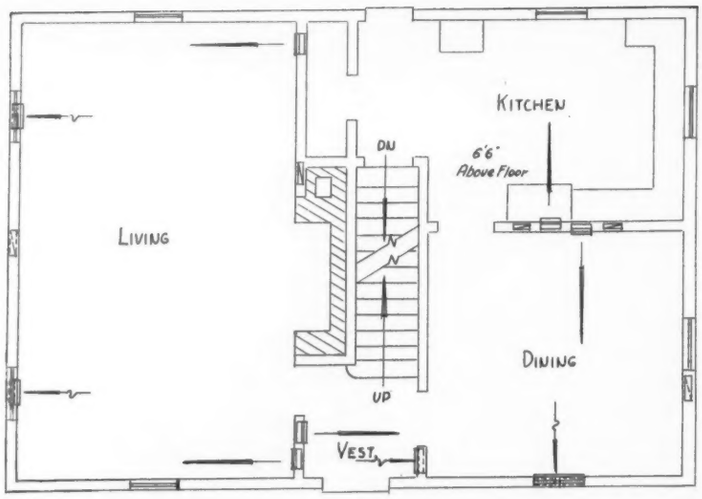
Another Suburban fundamental is the proper training of shop executives and outside men. This means school at the office every Tuesday evening presided over by either Arnold or Howard Rose, officers. New merchandising outlets, new apparatus available, present and past projects are discussed.

In the opinion of Mr. Rose a full line of equipment likewise is important. This dealer is both anxious and able to fill orders for practically any demand that involves heating, ventilation and refrigeration in all ramifications, fired by oil, gas or coal. The Suburban company is, incidently, the Carrier agent for Westchester County and Southern Connecticut.

Complete Control Over the Job

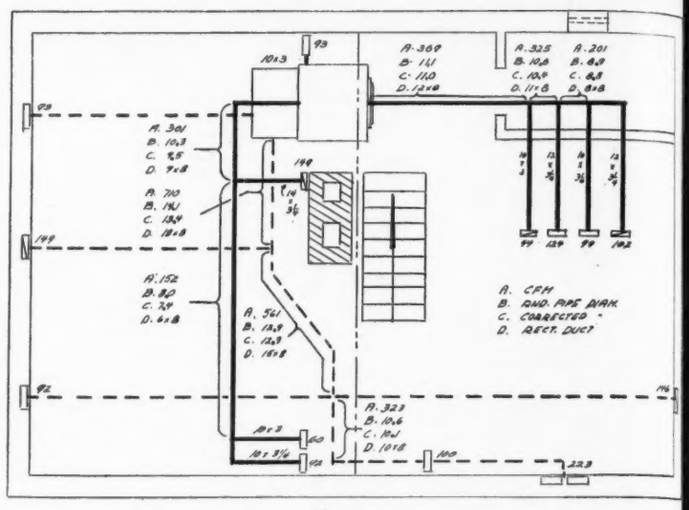
Still another point in adequate organization is believed to be undivided responsibility. The successful air conditioning contractor should have his own sheet metal shop; his own erection and service staffs. Undivided responsibility is best. Inspection and service may not end when the last seam has been closed and the heat turned into the system. One must check up for awhile to make sure that loose ends have been tied and customer satisfaction assured. A complaining customer can do more harm than the good done by a dozen satisfied owners. "Give the customer a square deal," is the way Mr. Rose puts it.

Management of outside salesmen offers still another problem not fully discussed here. Suburban does believe, however, that constant alertness, many daily calls, centering attention on the most likely prospects for closing orders, making contacts with all clases of structure and occupancy, factory and bungalow must all be regarded as basic in accumulating a satisfactory prospect file. Experience indicates, finally, that a reasonable number of daily calls, say, 10, will bring a fat prospect file with every prospect of sales closing at reasonable profit.



FIRST FLOOR

Fig. 1A—First floor plan showing register locations as used to determine actual and equivalent lengths of pipe.



BASEMENT

Fig. 1B—Basement plan with duct runs. The CFM; round pipe sizes (uncorrected); round pipe sizes (corrected); and rectangular duct sizes for sections of main duct have been entered as shown.

Technical Code—*Precalculated* [Part 5]

By Henry Aronson

Field Engineer, Premier Furnace Co.

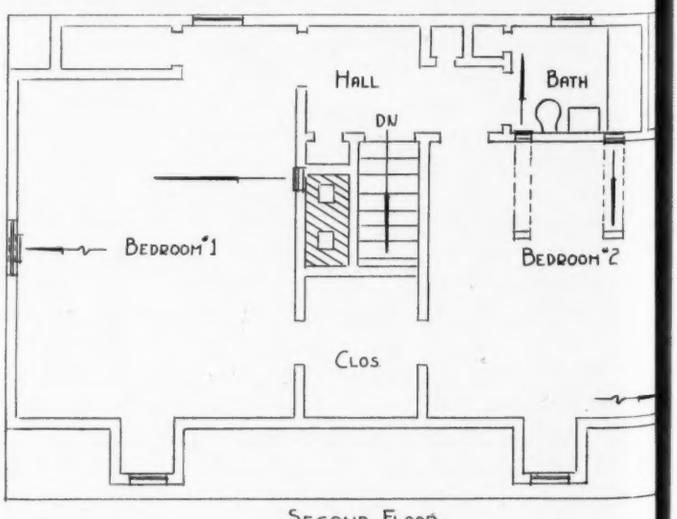
TAKING up where the February article left off, the first step in sizing ducts is to obtain equivalent lengths for the various sections of ductwork. To do this, it is necessary to substitute for turns, elbows and register boxes, lengths of straight pipe having approximately the same resistance. Article 6, Section 2 of the code, in Example 1, assumes 10 feet of straight pipe as equivalent to a 90-degree elbow, and 5 feet as equal to a 45-degree turn or stack head. This is close enough for practical purposes.

Table 10 gives more complete information, but this table is complicated to use and runs into the problem where it is necessary to have the pipe sizes before the resistance is figured, and the sizes cannot be accurately stated before the resistance is known. This means making assumptions, so it is advisable to use the first mentioned method.

The writer believes that this step in code procedure can be eliminated completely except where the equivalent lengths are *over* 100 feet. Where they are less, dampers will take care of balancing. The difference in material is negligible and there will also be some leeway to take care of any unforeseen bends in the ductwork. However, in following out the code, and using the living room (Fig. 1A) as an example, the short run is straight off the plenum (Fig. 1B) and makes a 90-degree turn into the stack, or head. This is equivalent to 10 feet for the 90-degree turn, and 5 feet for the head, making a total of 15 feet. This is added to the actual length, 3 feet, already noted on the data sheet, Fig. 2, in column "Equiv. Length," giving an equivalent length of 18 feet for this run. The other living room run has an additional 90-degree turn at the takeoff and a 90-degree elbow in the trunk. This makes 20 feet more to be added to the stack head loss (5 feet) and branch connection (10 feet), or a total of 35

◆

Right—Fig. 1C—Second floor plan used to select runs with longest equivalent lengths. Longest equivalent length determines the equivalent length used to size sections of main duct. See text.



SECOND FLOOR

HEATING CONTR. Allweather Conditioning Co OWNER L. M. Hurden DATE 11-15-40

ADDRESS ADDRESS 712 Powhatan Dr

CITY Chicago, Ill CITY Edgebrook, Ill

EQUIPMENT FUEL Coal TEMP. DIFF. 80 REGISTER LOC. Base DESIGN TEMP. 145 BONNET TEMP. 160

Room Dimensions	Cubical Cont.	Crackage 3R.3	Exp Wall	Glass .43	Net Wall .19	Exp Floor .08	Exp Ceil. .08	Attic Wall .22	B.T.U. Per Deg. T.D.	Equiv. Length	Reg. Temp. C.F.M.	Rnd. Pipe Corr.	Rect. Duct	Vol. Reg.	Equiv. Length	Rnd. Pipe Corr.	Rect. Duct	Vol. Reg.
Living 21½x13½x9	2673	39 28	49 441	48 55	393 75	297 24	42 3		195 93	3+15 18	150 93	6.7 4.9	10x3		50	6.7 5.9	8x3½	
Kitchen 12½x9½x9	1069	40 28	25 225	38 43	187 36	119 10			117	21+35 56	145 124	7.4 6.7	12x3½					
Dining 12½x11½x9	1294	19 18	24 216	24 28	192 37	144 12	36 3		93	17+35 52	145 99	6.8 6.0	10x3¼		70	9.2 8.6	14x4½	
Vestibule 5½x5½x9	272	21 15	5½ 50	19 22	31 6	30 2	18 1		46 11 57	22+35 57	145 60	5.6 5.1	10x3		65	6.8 6.3	12x3	
Bedroom #1 15½x13½x8	1728	26 18	21-168 33-184	27 30	150 28		216 17	175 39	132	24+35 64	140 149	7.9 7.3	14x3½		65	7.9 7.1	14x3¼	
Bath 7x5x8	280	13 9	7-56 5-40	7 8	49 9		35 3	40 9	38	24+55 84	140 44	5.0 4.9	10x3					
Bedroom #2 12½x13½x8	1250	18 13	23-100 17-136	19 20	91 17		156 13	127 28	91	33+56 88	140 102	6.9 6.8	12x3¼		75	7.8 7.5	14x3½	
Hall 5½x5x8	220		5½ 44		44 9		28 2		11									
Living Reg #2									92	33+35 58	145 98	6.8 6.2	10x3¼		70	6.7 6.3	12x3	
TOTALS	8786	124		306	217	48	42	76	713		769							

B.T.U. Per Deg T.D. 713 × T.D. 80 Total B.T.U. 57,040

Fig. 2—Data Sheet which has been filled in progressively as articles appeared. So far heat losses have been determined; actual and equivalent lengths scaled; uncorrected round pipe selected and corrected; and round pipe converted to rectangular pipe.

feet to be added to the actual length. (See column "Equiv. Length," last item.)

The bath and bedroom No. 2 (Fig. 1C) have two additional turns where they run between the floor joists. Other branches are calculated in the same way. The actual length and the feet of pipe to be added for turns, fittings, etc., are added as shown in Fig. 2, column "Equiv. Length" and the total shown in the same space.

Duct Sizes From Precalculated Charts

When the equivalent lengths have been entered on the data sheet, the duct sizes may be determined. The uncorrected round pipe sizes are first taken from the CFM capacities charts, Fig. 3A and Fig. 3B. According to Article 6, Section 2, Item g, the design static pressure for a system with a total delivery of less than 1,600 CFM should be .06 per 100 feet. The use of the CFM chart is obvious. Simply read down the .06 SP column to the CFM that is closest to the requirements of the duct section being sized, then read across to the round pipe column. Place the diameter shown in the round pipe column of the data sheet.

For example, the living room register with 93 CFM will require the capacity of a 6.7 inch round pipe to supply it. The other living room register needs 98 CFM or, at .06 SP, a 6.8-in. round pipe. The same procedure is followed for all other registers. Naturally the fabrication of the ducts will greatly influence the actual resistance encountered. Needless to say all work should be streamlined as much as possible and elbows should avoid short radii.

The CFM charts follow the figures given in the code and the rectangular duct sizes corresponding to various round pipe sizes are also taken from the code. Both of these vary somewhat from the latest figures released by the ASHVE, but are not very significant as the variations tend to offset one another. At the right side of the chart is a table showing capacities at various velocities. These capacities apply *only to the round pipe sizes* as velocity is affected only by area and is independent of friction.

This part of the chart should be of major use to designers who follow a velocity method of duct design, but also provides a method of checking velocities that occur in a duct sized by the friction method. Velocities are reasonably close on rectangular ducts with a low aspect ratio (ratio of width to depth) but will vary considerably on ducts with a high aspect ratio, where the velocities will be as much as 10% lower in the range of residential duct sizes.

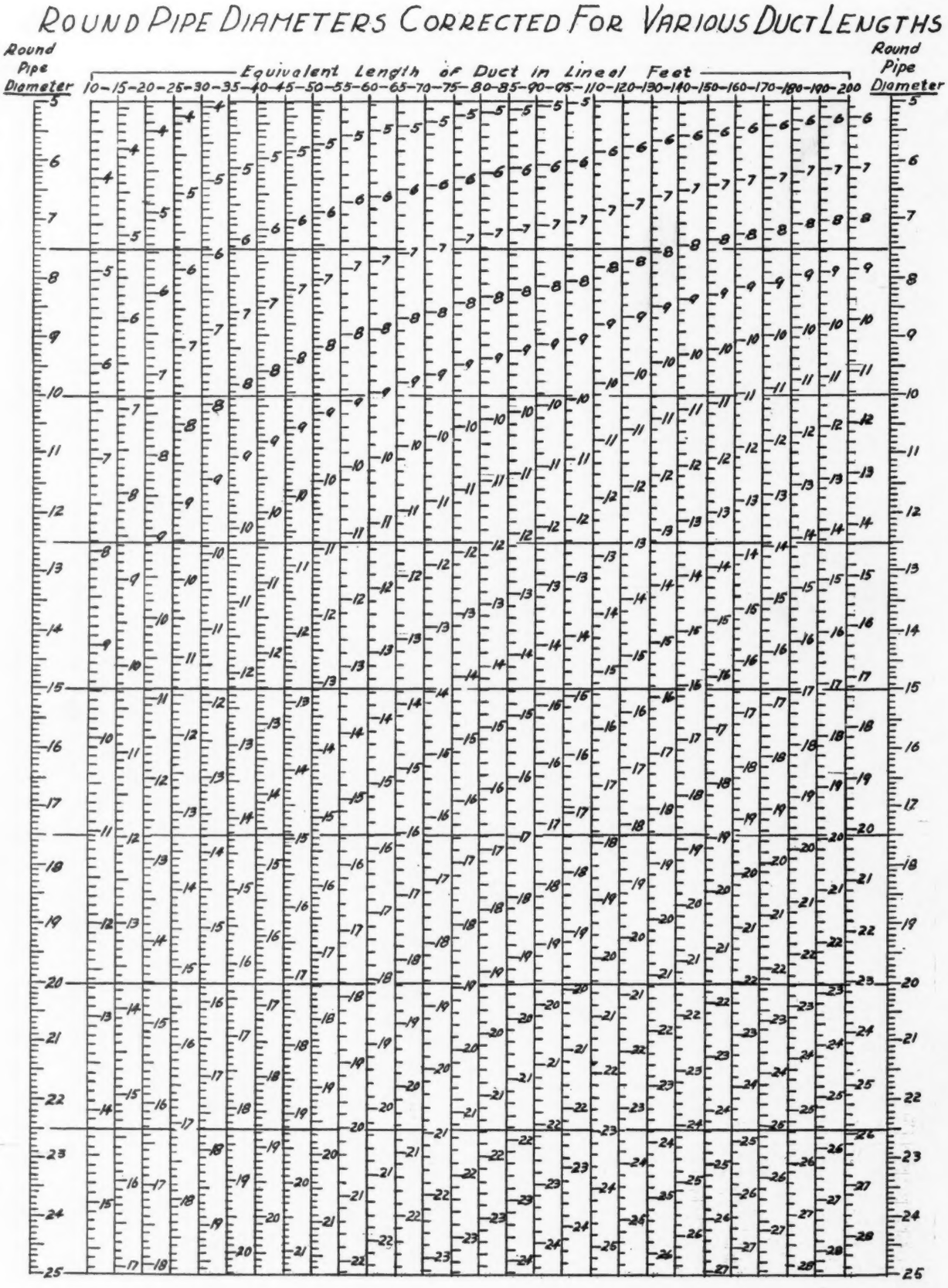
Fig. 3A

Static pressure loss per 100 feet					Rnd. Pipe Diam.	Side of rectangular duct for equal friction											Velocity (applies to rnd. pipe diam. only)							
.06	.08	.10	.12	.15		3	3½	3½	4	4½	5	6	7	8	9	10	12	300	400	500	600	700	800	900	1000
45	50	55	65	70	5.0	7							3					41	55	68	82	95	109	123	136
47	55	60	67	75	5.1		7	7	6	6	5	4		3	3	3		43	57	71	85	99	114	128	142
50	57	65	70	80	5.2	8							4				3	45	59	74	88	104	118	134	148
53	60	67	75	85	5.3		8	8	7	7	6	5		4	4	4		47	61	77	91	108	123	139	155
55	62	70	77	90	5.4	9												48	64	80	95	113	127	143	159
57	65	75	80	95	5.5		9	8	7	7	6	5		4	4	4		50	66	83	99	116	132	149	165
60	70	80	85	97	5.6	10							5				4	52	68	86	102	120	137	154	171
62	75	82	90	100	5.7		10	9	8	8	7	6		5	5	4		53	71	89	106	124	142	160	177
65	77	85	95	105	5.8	11							6				4	55	73	92	110	129	147	165	180
70	80	90	100	110	5.9		11	9	8	8	7	6		5	5	4		57	76	95	114	133	152	171	184
73	82	95	102	120	6.0								7				4	59	79	98	118	137	157	177	196
75	85	100	105	125	6.1		12	10	9	8	8	7		6	5	5		61	81	103	122	142	162	183	203
78	90	102	110	130	6.2	12							8				5	63	84	105	126	147	168	187	210
80	95	105	115	135	6.3		13	11	10	9	9	8		7	6	6		65	87	108	130	152	173	195	217
85	100	110	120	140	6.4	13							9				6	67	89	112	134	156	178	201	223
90	105	115	125	145	6.5		14	12	11	10	10	9		8	7	7		69	92	118	138	161	184	207	230
92	110	120	130	150	6.6	14							10				7	71	95	120	143	166	190	214	238
95	112	125	135	160	6.7		15	13	12	11	11	10		9	8	8		73	98	123	147	171	196	220	245
100	115	130	145	165	6.8	15							11				8	76	101	126	151	177	202	227	252
105	120	135	150	170	6.9		16	14	13	12	12	11		10	9	9		78	104	130	156	182	208	234	260
110	125	140	155	175	7.0								12				9	80	107	134	160	187	214	241	267
112	130	150	160	185	7.1			15	14	13	13	12		11	10	10		83	110	138	165	192	220	247	275
115	135	155	170	190	7.2								13				10	85	113	141	170	198	226	255	283
120	140	160	175	200	7.3	16		16	15	14	14	13		12	11	11		87	116	145	174	203	233	262	291
125	145	165	180	205	7.4								14				11	90	120	149	179	209	239	269	299
130	150	170	185	215	7.5					15	15	14		13	12	12		92	123	153	184	215	245	276	307
135	155	175	190	220	7.6								15				12	94	126	156	189	221	252	284	315
140	160	180	195	230	7.7						16	15		14	13	13		98	129	162	194	226	259	291	323
145	165	190	205	235	7.8								16				13	100	133	166	199	232	265	299	332
150	170	195	210	245	7.9									15	14	14		102	136	170	204	238	272	306	340
155	180	205	220	255	8.0												14	105	140	175	209	244	279	314	349
160	185	210	230	265	8.1												15	107	143	178	215	251	286	322	358
165	190	215	235	270	8.2												16	110	147	183	220	257	293	330	367
170	195	220	240	280	8.3													113	150	188	226	263	301	338	376
175	200	230	250	290	8.4													116	154	192	231	269	308	346	385
180	210	240	260	300	8.5													118	158	197	237	276	315	355	394
190	220	250	270	310	8.6													121	161	202	242	282	323	363	403
195	225	255	280	320	8.7													124	165	206	248	289	330	371	413
200	230	260	285	330	8.8													127	169	211	253	295	338	380	422
210	240	270	290	340	8.9													130	173	216	259	302	347	389	432
215	250	280	305	350	9.0													132	177	221	265	309	353	398	442
220	255	285	310	360	9.1													136	181	226	271	316	361	407	452
225	260	295	320	370	9.2													139	185	231	277	323	369	416	462
230	265	300	330	380	9.3													142	189	236	283	330	377	425	471
240	275	310	340	390	9.4													145	193	241	289	337	385	434	481
245	280	320	350	400	9.5													148	197	246	295	345	394	443	492
250	290	330	360	415	9.6													151	201	251	302	352	402	452	503
260	300	340	370	430	9.7													154	205	257	308	359	410	462	513
270	310	350	380	440	9.8													157	210	262	313	366	419	467	524
275	320	360	390	450	9.9													160	214	267	321	374	428	481	535
280	325	370	400	460	10.0													164	218	273	327	382	436	491	546
290	335	380	410	475	10.1													167	223	278	334	390	446	502	558
295	345	390	420	485	10.2													170	227	283	340	397	454	510	567
305	350	400	435	500	10.3													174	232	290	348	406	464	522	580
310	360	410	445	510	10.4													179	236	295	354	413	472	532	590
320	370	420	455	525	10.5													180	240	302	360	420	480	540	600
330	380	430	470	540	10.6													184	245	307	368	430	491	552	614
335	390	445	480	555	10.7													187	249	312	374	436	498	561	623
345	400	455	495	570	10.8													191	254	318	382	446	509	573	637
350	410	470	505	585	10.9													194	259	323	388	453	517	582	647
360	420	480	520	600	11.0													198	264	330	396	462	528	594	660
370	430	490	530	615	11.1													202	269	337	404	471	539	606	673
380	440	500	545	630	11.2													206	275	343	412	480	549	618	687
390	450	515	555	640	11.3													208	278	347	416	486	555	624	694
400	460	525	570	655	11.4													211	282	352	422	493	563	633	704
410	470	535	580	670	11.5													216	288	360	432	504	576	648	720
420	485	550	595	685	11.6													220	293	367	440	514	587	660	734
430	495	560	610	700	11.7													224	299	373	448	523	597	672	747
440	510	575	620	720	11.8													228	304	380	456	532	608	684	760
450	520	585	635	735	11.9													232	310	387	464	541	619	696	774
460	535	600	650	750	12.0													236	314	393	471	550	628	707	785
470	550	615	670	770	12.1													240	320	400	480	560	640	720	800
480	560	630	685	785	12.2													244	325	406	488	570	651	732	814
495	575	640	705	805	12.3													248	331	414	496	579	661	744	826
505	585	655	720	820	12.4													252	336	420	504	588	672	756	840
515	600	670	740	840	12.5													256	341	427	512	597	683	768	854
525	610	685	755	860	12.6													260	347	433	520	607	693	780	867
535	625	700	770	880	12.7													264	352	440	528	616	704	792	880
550	635	720	790	900	12.8													268	357	447	536	625	715	804	893
560	650	735	805	920	12.9													272	363	453	544	635	725	816	906

Fig. 3B

Static pressure loss per 100 feet					Rnd. pipe	Side of rectangular duct for equal friction											Velocity (applies to Rnd. pipe diam. only)							
.06	.08	.10	.12	.15	Diam.	3	3½	3½	4	4½	5	6	7	8	9	10	12	300	400	500	600	700	800	900	1000
570	660	750	820	940	13.0							25	20	17	15	13	11	276	368	460	552	644	736	827	920
580	675	765	835	960	13.1								21					280	373	466	560	653	746	840	933
595	690	780	850	975	13.2							26				14	12	284	378	473	568	663	758	852	947
605	710	800	870	995	13.3								22	18	16			289	385	482	578	674	770	866	963
620	725	815	885	1010	13.4							27						294	392	490	588	636	784	882	980
630	740	830	900	1030	13.5								23					298	398	497	596	695	795	894	993
645	755	850	920	1050	13.6									19				302	403	504	604	705	805	906	1006
660	770	865	935	1075	13.7							28			17	15		307	409	511	614	716	819	921	1028
670	780	885	955	1095	13.8								24	20				312	416	520	624	728	832	936	1040
685	795	900	970	1120	13.9							29					13	316	422	526	632	737	842	948	1052
700	810	920	990	1140	14.0													320	427	534	641	747	855	961	1068
714	825	935	1010	1160	14.1													325	434	542	650	759	866	975	1082
730	840	950	1030	1180	14.2							30		21	18	16		330	440	550	660	770	880	990	1100
740	860	970	1050	1200	14.3								25					334	446	557	668	780	891	1002	1113
760	875	985	1070	1220	14.4							31						339	452	565	679	791	904	1018	1130
770	890	1000	1090	1240	14.5								26	22	19			344	459	573	688	803	917	1032	1148
785	905	1020	1110	1265	14.6							32				17	14	350	465	582	697	815	930	1047	1162
800	920	1040	1135	1290	14.7							33						354	472	590	708	826	944	1062	1180
810	940	1060	1155	1310	14.8								27	23				358	477	596	716	835	954	1074	1192
825	955	1080	1180	1335	14.9							34			20			363	484	605	726	847	968	1089	1210
840	970	1100	1200	1360	15.0								28			18	15	368	491	614	736	859	982	1104	1227
855	985	1120	1220	1390	15.1							35		24				373	497	622	746	870	995	1120	1243
870	1005	1140	1240	1420	15.2										21			378	504	630	756	882	1008	1135	1260
890	1020	1160	1260	1445	15.3							36	29			19		383	511	638	766	894	1021	1149	1277
905	1035	1180	1280	1475	15.4							37		25				388	517	647	776	906	1035	1165	1294
920	1050	1200	1300	1500	15.5							38	30	26	22		16	393	525	655	786	918	1049	1180	1321
935	1070	1220	1325	1530	15.6							39						398	532	663	796	929	1062	1195	1328
950	1085	1240	1350	1560	15.7								31			20		403	538	672	807	941	1075	1210	1344
965	1100	1260	1370	1585	15.8							40		27	23			409	548	681	817	953	1089	1226	1362
985	1120	1285	1395	1615	15.9								32					414	552	690	828	965	1103	1241	1379
1000	1140	1310	1420	1640	16.0							41						419	559	698	837	978	1117	1257	1396
1015	1160	1330	1445	1670	16.1								33	28	24	21	17	424	566	707	848	990	1131	1273	1414
1030	1180	1355	1470	1695	16.2							42						429	572	716	859	1002	1149	1288	1431
1050	1200	1380	1495	1725	16.3								34					435	580	725	870	1014	1159	1304	1449
1065	1220	1405	1515	1755	16.4							43						440	587	733	880	1027	1173	1320	1467
1080	1245	1430	1540	1780	16.5							44	35	29	25	22	18	445	593	742	890	1038	1186	1335	1483
1095	1265	1450	1565	1810	16.6							45	36	30				451	601	751	902	1052	1202	1352	1503
1115	1290	1475	1585	1835	16.7										26	23		456	608	760	912	1064	1216	1368	1520
1130	1310	1500	1615	1865	16.8							46		31				462	616	770	924	1078	1232	1386	1540
1150	1335	1525	1640	1895	16.9								37				19	467	623	779	935	1090	1246	1402	1558
1170	1355	1550	1670	1920	17.0							47	38	32	27	24		473	631	788	946	1103	1261	1419	1576
1190	1380	1570	1700	1950	17.1							48						479	638	798	957	1117	1276	1436	1595
1210	1400	1595	1725	1980	17.2								39					484	645	807	968	1129	1290	1452	1613
1230	1420	1620	1755	2010	17.3									33	28			490	653	816	979	1142	1306	1469	1632
1250	1440	1650	1790	2040	17.4								40			25	20	496	661	826	991	1156	1322	1487	1652
1270	1465	1675	1820	2070	17.5										29			501	668	835	1002	1169	1336	1503	1670
1290	1490	1705	1855	2100	17.6								41	34				507	676	845	1013	1182	1351	1520	1689
1305	1510	1730	1885	2130	17.7								42			26	21	513	684	856	1026	1198	1369	1539	1721
1325	1535	1755	1915	2165	17.8								43	35	30			518	692	865	1038	1221	1383	1556	1739
1345	1560	1785	1945	2200	17.9													524	699	874	1048	1223	1398	1572	1747
1370	1585	1810	1980	2230	18.0								44	36	31	27	22	530	707	884	1060	1237	1414	1591	1767
1390	1610	1840	2010	2265	18.1									37				536	715	893	1072	1251	1429	1608	1787
1410	1635	1865	2045	2300	18.2								45		32			542	723	904	1084	1265	1446	1626	1807
1430	1660	1895	2075	2330	18.3											28		548	732	913	1096	1279	1461	1644	1828
1455	1680	1920	2110	2365	18.4								46	38			23	554	739	923	1108	1293	1477	1662	1846
1480	1705	1950	2140	2400	18.5										33			560	747	934	1120	1307	1493	1681	1868
1500	1730	1980	2170	2440	18.6								47	39		29		566	754	943	1132	1320	1508	1696	1885
1530	1755	2005	2205	2480	18.7								48				24	572	762	952	1143	1333	1522	1713	1904
1550	1780	2035	2235	2520	18.8									40	34			578	771	963	1156	1349	1542	1734	1926
1575	1805	2065	2270	2560	18.9											30		585	779	974	1169	1364	1559	1754	1949
1600	1830	2090	2300	2600	19.0									41	35			590	788	984	1181	1378	1575	1772	1969
1625	1855	2120	2330	2640	19.1											31	25	597	797	995	1195	1394	1593	1791	1981
1650	1885	2150	2365	2675	19.2									42	36			603	804	1005	1206	1407	1608	1809	2010
1675	1910	2180	2395	2720	19.3													609	813	1016	1219	1422	1625	1829	2031
1700	1940	2210	2430	2760	19.4									43				616	821	1026	1232	1437	1641	1847	2052
1720	1970	2240	2460	2800	19.5										37	32		622	829	1036	1244	1451	1658	1866	2073
1745	2000	2270	2500	2840	19.6									44			26	629	838	1047	1257	1467	1676	1886	2095
1770	2025	2300	2535	2880	19.7										38	33		635	847	1058	1270	1482	1695	1906	2118
1795	2055	2330	2575	2920	19.8									45				642	855	1069	1283	1497	1711	1924	2138
1820	2090	2370	2610	2960	19.9									46	39	34	27	648	864	1080	1296	1512	1728	1944	2160
1850	2120	2410	2650	3000	20.0									47				655	873	1091	1310	1528	1746	1965	2183
1930	2210	2520	2800	3200	20.5									48	42	36	29	669	918	1148	1318	1607	1837	2067	2296
2020	2420	2650	2960	3400	21.0										44	38	31	722	962	1203	1344	1684	1925	2166	2400
2120	2540	2800	3130	3620	21.5										46	40	32	756	1008	1260	1512	1764	2016	2268	2520
2230	2680	2960	3310	3840	22.0										48	42	34	792	1056	1320	1584	1848	2112	2376	2640
2350	2840	3130	3500	4100	22.5											45	36	827	1102	1378	1654	1929	2205	2480	2756
2490	3010	3310	3700	4330	23.0											47	37	865	1153	1441	1730	2018	2307	2595	2833
2640	3190	3500	3920	4600	23.5												39	903	1204	1505	1806	2107	2408	2709	3010
2800	3380	3700	4160	4880	24.0												40	942	1256	1570	1884	2198	2512	2613	3135
2970	3580	3920	4420	5200	24.5												43	980	1306	1633	1960	2286	2626	2940	3270
3150	3790	4160	4710	5420	25.0												45	1022	1362	1703	2044	2384	2720	3060	3410

Fig. 4


ROUND PIPE DIAMETERS CORRECTED FOR VARIOUS DUCT LENGTHS
Round Pipe Diameter
Equivalent Length of Duct in Lineal Feet
10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-110-120-130-140-150-160-170-180-190-200
Round Pipe Diameter

Correcting Round Pipe Sizes for Equiv. Length

The round pipe sizes having been entered, we now must correct these sizes for equivalent lengths, so that all pressure drops through the various branches will be somewhere near the same. To do this the correction chart Fig. 4, is used. The uncorrected pipe size is located on the left and right scales and along a straightedge read horizontally to the equivalent length column closest to that calculated for the branch. The result is the corrected diameter of a round pipe.

Example—The short run to the living room 93 CFM has an uncorrected round pipe diameter of 6.7 inches. Locating this on the scale and reading to the 20-foot column, shows a corrected diameter of 4.9. This is entered in the space provided on the data sheet (Rnd. Pipe-Corr.). The same is done for all the rest of the runs. Actually, the sizes arrived at are smaller than experience indicates as practical under average conditions. This is primarily due to considerable misapprehension as to the static pressure actually found in a residential system and the tendency of the installer to use a fan incapable of delivery against the pressure developed. It should be remembered that as sizes of ductwork go down, fan speeds and sizes, as well as power consumption go up. Experience has shown that on many jobs it is necessary to run register temperatures much higher than desirable to heat with jobs operating against a high resistance. In no case should round pipes under 6 inches or stacks smaller than 10x3 be used.

Converting Round Pipe to Rectangular

The corrected round pipe diameters must next be converted to rectangular duct sizes and stack sizes. Even on first floor runs, where the branches may connect directly to the head, this is done to size the head. In this case, wall stack is being used for branches. Where round pipe is used, the next larger commercial size of pipe is used where the corrected size ends in a decimal fraction.

To make the conversion, the CFM chart in Fig. 3 is again used and the sizes read directly from the center section of the chart, using the corrected round pipe sizes as a base. It will be noted that bedroom No. 1 requires a 13x3½ stack and a 14x3½ is specified as this is the closest commercial size. With some types of construction, this could not be used and two smaller runs would be necessary. However, when it is unnecessary to cross a beam, this size stack can ordinarily be worked in on new contruction. The writer favors making a 13½-inch stack standard as this can be used in most buildings.

When the individual duct sizes have been computed, the trunk line may be sized. The first step is to make a line drawing of the duct system and note the CFM required for each register and each branch on the drawing, as shown in the plan, Fig. 1B. Then the branch capacities (CFM) are added together progressively, starting at the register end of the duct and working towards the bonnet so the requirements of each section of the trunk are shown. This is shown on the plan clearly enough to make any further explanation superfluous.

Then the CFM table is referred to again and the round pipe sizes found in the same way as they were for the branches. The trunk line must then be corrected in the same way as the branches were. *All sections of the trunk line are corrected for the equivalent length of the longest branch that comes off of it.* The trunk on the left of the beam is corrected for an equivalent length of 64 feet (Bedroom No. 1) and the other one for 88 feet (Bedroom No. 2). The calculations have been written in on the plan in sequence. The rectangular equivalents are then taken from the CFM chart. The duct has been kept to a depth of 8 inches, and final sizes have been placed on the plan.

Sizing Return System

The return air side of the system is sized the same way as the supply side, except that equivalent lengths only are considered as there is no appreciable temperature change in the ducts. It will be seen that no returns were taken from the kitchen or bathroom, but that adjoining room capacities have been increased correspondingly. If the bathroom and kitchen were vented, this would be unnecessary, but provision for outside air would have to be made and the heat load adjusted accordingly.

This venting is proper, but in actual practice it just isn't being done in small low cost homes. Ventilation is provided by opening the windows for short periods when the resident feels the necessity.

The return in the hall is oversized, as when the bedroom doors are opened, more air will return down the stairway than through the second floor returns in most cases. Where structural conditions permit, placing a large return in the tread of the bottom step and placing a warm air halfway up the wall so it discharges across the stairway give excellent results. The last four columns on the data sheet are for the return side.

The capacities required have been spotted on the plan. The duct sizes and lengths have been found in exactly the same way that they were for the warm air side. Correcting and converting the sizes are done in the same manner also. Unlined stud spaces are being used as stacks and panned

(*Continued on page* 132)

Air "Avidity"

A New Thought in Residential Humidification (Part 1)

By O. J. Kuenhold

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THE importance of proper air humidity in homes during the heating season is becoming recognized more widely each year. Proper room temperature is the chief factor in producing "bodily" comfort but proper humidity is the chief factor in producing "breathing" comfort. Modern conditioned air heating should recognize not merely the importance of "bodily" comfort, but also the importance of "breathing" comfort.

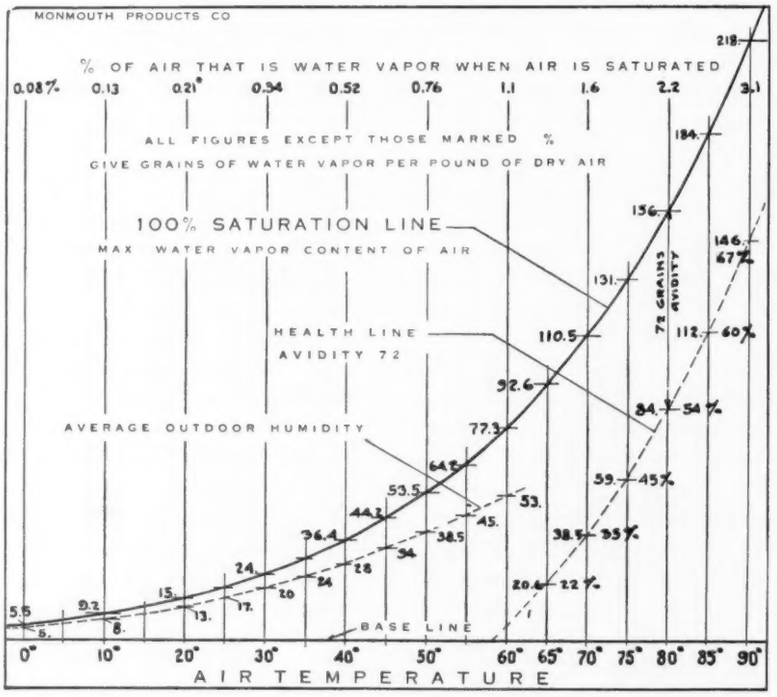
Bodily comfort and breathing comfort are two separate and distinct feelings. For instance, at 80° room temperature and low air humidity one may have complete bodily comfort but the super-dry air may give one a dry, stuffy feeling. This is breathing *dis*comfort.

The moisture secreting pores or glands of our upper breathing passages can supply the moisture which is absolutely necessary for these surfaces at a certain rate. When air is breathed having such high moisture "avidity" that the natural moisture of these breathing passages is absorbed by the inspired air faster than it can be replaced, the result is breathing discomfort—that choky, stuffy feeling which is the first warning of an unhealthful condition.

Considerable research has been done on factors producing bodily comfort. The facts are quite well known. Not so much actual research has been done on breathing discomfort although many thousands of people are thoroughly aware of its existence and at least vaguely conscious of its cause.

The prime essential in understanding air humidity and its behavior is to have proper measurements. The term "relative humidity" which is almost universally used is not a direct measurement of the properties of air moistness. It leads to confusion and misunderstanding. This article aims to explain facts about air humidity and lay the foundation for a better understanding of air properties and effects of air on breathing comfort.

Chart I



Air Temperature Controls Moisture Content

Air is a gaseous mixture always containing some water in the form of an invisible gas, called "water vapor" which is, so to speak, "dissolved" in the air. The amount of water vapor which air can contain in "dissolved" condition depends upon the air pressure and temperature. The variation in atmospheric pressure at the earth's surface is, however, too small to have sufficient effect to require any further consideration in this article.

The influence of air temperature upon the amount of water vapor that air can contain is considerable. This is graphically shown by the upper curve in Chart 1. The vertical lines indicate various air temperatures from 0° to 90° Fahrenheit. The vertical distance from the base line to the "saturation line" indicates proportionately how many grains of water vapor each pound of air can hold "in solution," the exact number of grains being given. Note that at 90° each pound of air can hold 218 grains while at 0° it can hold only 5.5 grains. At 70° each pound of air can hold 110.5 grains—20 times as much as at 0°.

The water vapor content of air is given in grains per pound of air, instead of per cubic foot, because by giving the quantity of air in pounds we need not consider its expansion or contraction under temperature change. At 70° a cubic yard of air weighs close to two pounds. A grain is one 7,000th of a pound. A drop of water weighs about 4 grains. The above enables you to get an idea of what is meant by a pound of air or a grain of moisture.

Definition of Relative Humidity

When air holds all the moisture it can hold in gaseous form it is said to be 100% saturated. When the air holds 50% or 35% of the water vapor it can hold at any given temperature then it is respectively 50% or 35% saturated.

The weight of water vapor that air holds when 100% saturated is a very small per cent of the weight of the air. These percentages are given at the upper end of the temperature lines in Chart 1. For instance, at 70° the most water vapor that air can absorb forms only 1.6% of the air. At 35% saturation this will be less than 0.6%.

When more moisture than the air can absorb at its temperature is injected by a water spray or steam jet, the surplus will be in the form of a visible mist and this will deposit in ducts or on other surface. If air is cooled so that at its reduced temperature it cannot hold all the water vapor it originally contained, the surplus will assume an "undissolved" mist form. For example: if air at 80° containing 84 grains of water vapor per pound is cooled to 50° when it can absorb only 53.5 grains per pound (see Chart 1) the surplus of 30.5 grains will condense as a mist.

In our consideration of air humidity we are concerned only with the water vapor that air can fully absorb as an invisible gaseous vapor. In other words, we shall only consider air that is 100% or less than 100% saturated. This per cent of saturation is commonly called the "relative humidity" of the air.

Relative Humidity Not True Comfort Index

Originally the term "relative humidity" was employed by scientists as a basis for making various calculations. But when humidification became popular, the expression "relative humidity" was adopted for popular use but in such use its true meaning and purpose was entirely lost. Relative humidity seems to mean comparative air moistness and the general public accepts it to be the sole and complete measurement of how moist or dry, how much water vapor the air can impart or absorb and how harmful or healthful the air is. The general public, the heating industry and even physicians and heating engineers commonly speak of the per cent of relative humidity as though at a given per cent of humidity, the properties of the air with regard to moisture is the same regardless of its temperature. It is generally assumed that air at 35% relative humidity, for instance, is equally dry at 60° or 80°. The actual fact is that the air in the above example is more than twice as dry at 80° as at 60° and yet the relative humidity is exactly the same (35%) in both cases. This illustrates how very misleading the term "relative humidity" can be as it is commonly and wrongly used.

The term "relative humidity" is merely a mathematical term denoting the ratio between the water vapor that the air actually holds and the maximum water vapor it can hold. It means absolutely nothing until we also know the temperature of the air, when we can use the relative humidity as a basis to calculate how much water vapor the air contains. But even if we know how many grains of moisture each pound of air holds, we still do not know the characteristic of the air that is most important in humidification, namely, the activity of the air in extracting moisture from walls, ceiling, floor, woodwork, furniture, carpets, drapes, varnish, etc., and from the skin, hair, eyes and breathing passages of humans.

Air "Avidity" Is Suggested

As a matter of fact we are not directly interested in the per cent of saturation of the air or how much water vapor it contains. The vital point is "how much *more* moisture can the air hold." It is the capacity of the air for absorbing

Table II

Per Cent Saturation—Use to Find Moisture Content	Air Temperature													Per Cent Saturation—Use to Find Moisture Avidity
%	0°	10°	20°	30°	40°	50°	60°	65°	70°	75°	80°	85°	90°	%
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
5	.27	.5	.75	1.2	1.8	2.7	3.9	4.6	5.5	6.6	7.8	9.	11.	95
10	.55	.9	1.5	2.4	3.6	5.3	7.7	9.3	11.	13.1	15.6	18.	22.	90
15	.82	1.4	2.25	3.6	5.5	8.1	11.6	13.9	16.5	19.7	23.4	28.	33.	85
20	1.1	1.8	3.	4.8	7.3	10.7	15.5	18.5	22.	26.	31.	37.	44.	80
25	1.4	2.3	3.75	6.0	9.1	13.4	19.	23.	28.	33.	39.	46.	54.	75
30	1.6	2.75	4.5	7.25	10.9	16.	23.	28.	33.	39.	47.	55.	65.	70
35	1.9	3.2	5.25	8.4	12.7	18.7	27.	32.	39.	46.	54.	65.	76.	65
40	2.2	3.7	6.0	9.6	14.6	21.4	31.	37.	44.	53.	62.	74.	87.	60
45	2.5	4.1	6.75	10.9	16.4	24.	35.	42.	50.	59.	70.	83.	98.	55
50	2.7	4.6	7.5	12.0	18.2	27.	39.	46.	55.	66.	78.	92.	109.	50
55	3.0	5.0	8.25	13.3	20.0	29.	42.5	51.	61.	72.	86.	101.	120.	45
60	3.3	5.5	9.0	14.5	21.8	32.	46.	56.	66.	79.	94.	111.	131.	40
65	3.6	6.0	9.75	15.7	23.7	35.	50.	60.	72.	85.	101.	120.	141.	35
70	3.8	6.5	10.5	16.9	25.5	37.	54.	65.	77.	92.	109.	129.	152.	30
75	4.1	6.9	11.25	18.1	27.	40.	58.	70.	83.	99.	117.	138.	163.	25
80	4.4	7.3	12.0	19.3	29.	43.	62.	74.	88.	105.	125.	148.	174.	20
85	4.7	7.8	12.75	20.5	31.	45.	66.	79.	94.	112.	132.	157.	185.	15
90	4.9	8.25	13.5	22.	33.	48.	70.	83.	100.	118.	140.	166.	196.	10
95	5.2	8.7	14.25	23.	35.	51.	74.	88.	105.	125.	148.	175.	207.	5
100	5.5	9.2	15.0	24.	36.	54.	77.	93.	110.5	131.	156.	184.	218.	0
%	0°	10°	20°	30°	40°	50°	60°	65°	70°	75°	80°	85°	90°	%
	Air Temperature													

more moisture that counts. This measures its "avidity" for moisture.

In order to properly and fully understand air humidity we need a new term to express and directly measure how avid the air is for moisture. The writer hereby presents such a term to be called the "moisture avidity" of the air. This will tell how many additional grains of water vapor each pound of air can absorb, over and above the water vapor it already holds. We will thus have a direct and accurate measurement of the moisture absorbing or drying power of the air at any temperature and per cent of saturation or relative humidity.

Table for Calculating Avidity

Table II gives the moisture avidity for various temperatures and per cents of saturation opposite the per cent of saturation *at the right* and below the temperature. For instance at 70° and 35% saturation each pound of air can absorb 72 additional grains of water vapor. This 72 is its moisture avidity.

An inspection of Table II will disclose a number of surprises, all of which will be very enlightening, however. For instance in 80° summer weather and at 55% relative humidity which is usual in summer, you will find the air avidity at 70 grains. Avidity in the vicinity of 70 grains is, as a matter of fact, just about ideal. Note that at 70° room temperature you should add sufficient water vapor to the air to reduce the avidity to about 70. This will be about 35% relative humidity, which is about ideal for 70°.

If we could feel comfortable at 65° we would only need to have 25% relative humidity at which the avidity is 70. But if, because of the very light clothing that women wear, a room temperature of 75° is demanded then we must raise the relative humidity to about 45% to hold the avidity down to 72. Similarly, for 85° room temperature we would have to humidify up to about 60%.

Table II can also be used to tell us how avid air is for moisture at any given per cent of relative humidity. For instance, let us take 35% humidity and see what this actually means at different temperatures. Following the 35% relative humidity line across from the right-hand column we find that at 60° the avidity is 50; at 65° it is 60; at 70° 72; at 75° 85; at 80° 101 and at 85° 120. Note the great variation in moisture absorbing activeness, yet at all of these temperatures the relative humidity is the same, 35%. This very plainly shows that the relative humidity means nothing until it is interpreted into terms of moisture avidity.

The left-hand column in Table II is used to find the number of grains of moisture each pound of air holds at various temperatures and per cents

(*Continued on page* 136)

$249 For Gas—Was $207 For Coal

In a Single Family Residence Converted to Four Apartments

When old, single family houses are converted into apartments, the elimination of fire-tending, ash-hauling, heating service, will frequently convince the owner of the value of automatic heat and winter air conditioning. The owner of the apartment conversion described here obtained all these at an increased cost of only $42 a year.

THIRTY-FIVE years or so ago the structure shown in the floor plans (next page) was built in Buffalo, N. Y., and was occupied as a single family dwelling until a short time ago. Then the house, having become surrounded by apartment houses, was divided as shown into four apartments, with a fifth apartment on the third floor, but unheated.

Because of reconstruction and because heating requirements had changed, the owners considered a new heating plant essential. Householder Heating Corp. of Buffalo suggested the system shown in the plans and was awarded the contract on the strength of several features which the owners liked very much.

Attention-Free Operation Sells Owner

The new system uses gas as a fuel instead of hand-fired coal thus eliminating fire tending service. Each room in the four apartments is assured plenty of heat with one supply in each room. Ventilation is assured by one return in each major room and a blower to insure air circulation. Cleanliness is provided by the air filters. It was not thought necessary to zone the system since each apartment is about the same as all others in exposure, heat loss, cubage, and usage. Accordingly, one day-night thermostat in the hall of the second floor controls the system.

Up to the time of reconstruction, a brick-set, gravity furnace using all outside air and burning hard coal was used. Registers were in baseboards and were large sized, ornate and dust catchers. At the time of reconstruction, the 6-inch partitions which divide front apartment from back were filled with insulation and an insulation cap was laid in the floor of the attic.

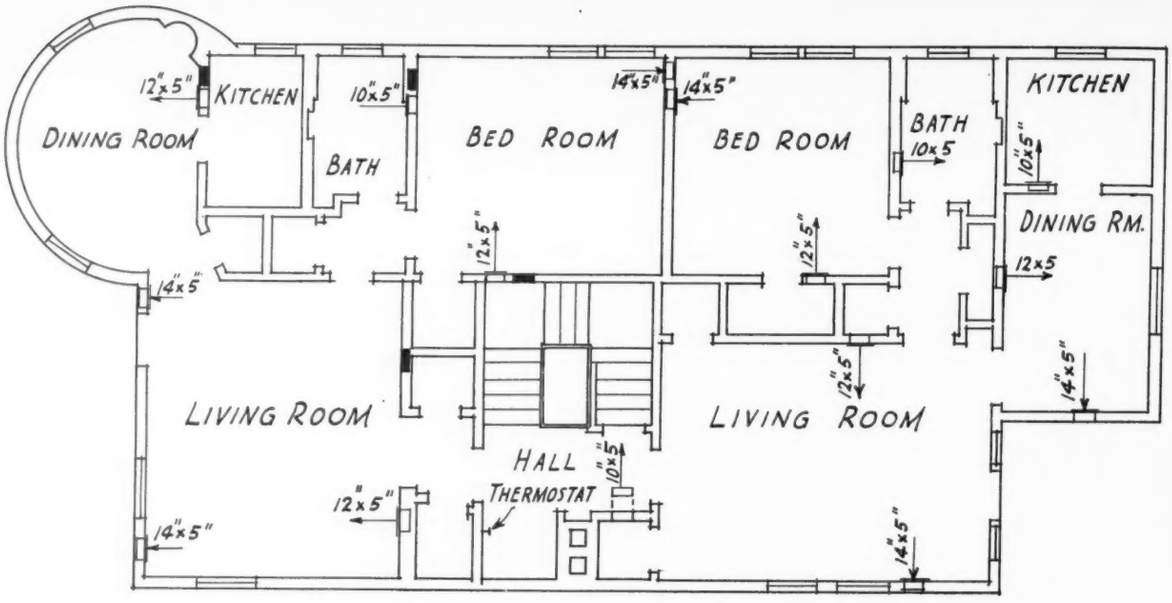
In making the preliminary survey, Householder representatives found that the 12-inch basement joists were exposed and rested on an 18-inch stone foundation. Also that the main partitions were directly above one another and open from basement to attic except for fire stops which might occur anywhere. Major partitions were 6 inches thick; minor partitions 4 inches.

It was thus possible to erect 3½-inch stacking in 12-inch lengths without too much trouble. All old stacking was thrown away so that the duct system might be completely new. The new registers were placed in the baseboards and were all 5 inches high by 10, 12, 14 inches wide. Registers with vanes adjusted to a 22½-degree down throw and without any horizontal dispersion were used. Return grilles were all placed in outside walls, as shown, and were all 14 by 5 inch. Stacks were run to the third floor for future heating, but were capped and are not in use.

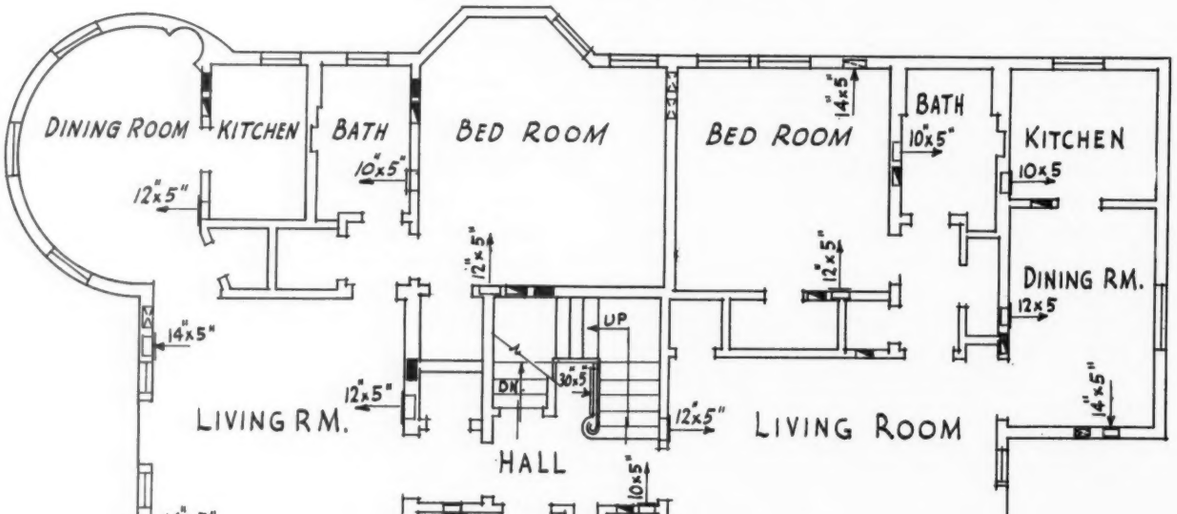
Details of Duct Design

A Lennox gas-fired winter air conditioning furnace was placed against one outside wall and about midway from front to back so that the duct system is rather evenly divided for length of runs and volume of air leaving the bonnet. The plenum was built up to within a few inches of the joists so that all mains are against the ceiling to increase head room.

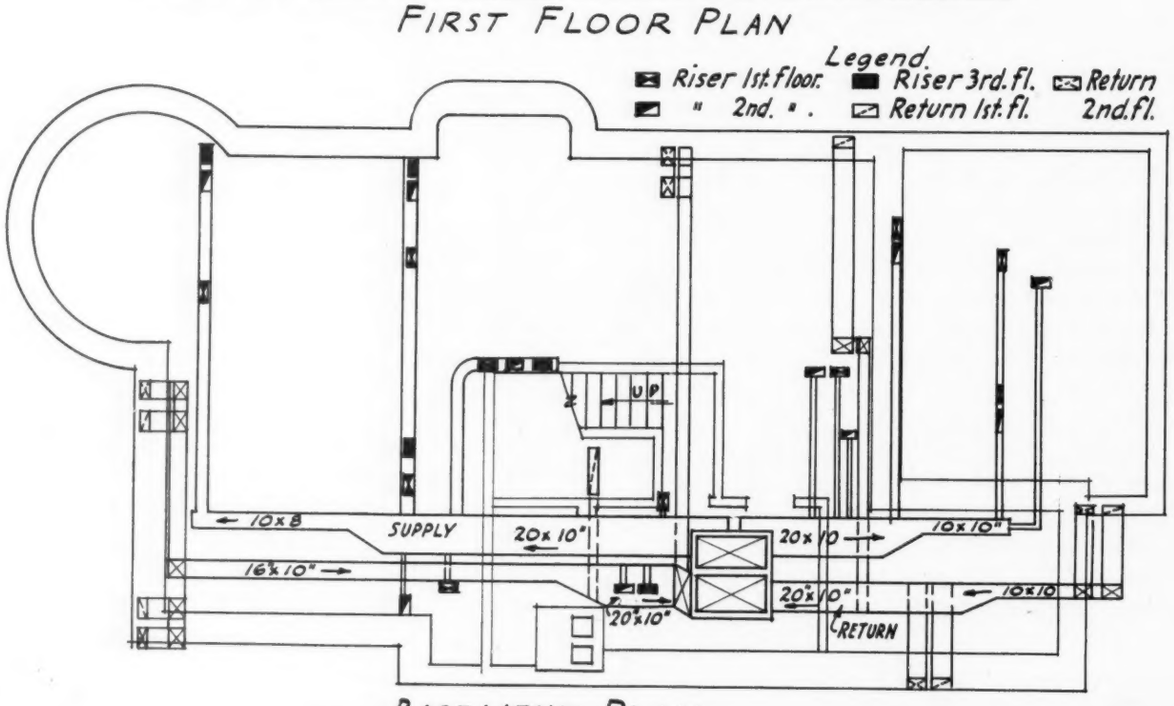
Main trunks are full rectangular pipe and are reduced in area after part of the branches are subtracted so that the mains are partly extended plenum and partly equal friction. Square elbows were used as the plans show, so to provide uniform velocity shop-made turning vanes were installed across the angle of each elbow. Shut off dampers were installed in each main close to the bonnet in order to balance the mains, but these dampers were purposely fitted loosely so



SECOND FLOOR PLAN



FIRST FLOOR PLAN



BASEMENT PLAN

that the main can not be completely shut off. These dampers are set and locked by quadrants.

Branches are all round pipe—run between joists where possible. As the plans show these branches are taken off the top and off the side of the main—whichever was most expedient. Branches taken off the side began as a special scoop section placed at 45 degrees to the main with the scoop inside the main. Branches off the top had a slightly different version of the same idea. A damper for balancing was placed in each branch close to the main and was set and locked with a quadrant.

Returns are both panned joists and full metal ducts depending on joist direction. No dampers were used in the returns. Returns, like supply mains, are flat against the joists.

The heat loss of the building was figured as 165,000 Btu with an additional 20,000 Btu loss in the unheated attic. Since future attic heat was contemplated the furnace was selected with a 275,000 Btu output at the bonnet.

The single thermostat turns the gas on and off. A fan switch in the bonnet starts and stops the fan. In mild weather the fan switch range is set for 125 degrees run and 105 degrees stop, but in cold weather the range is raised to 140 degrees run and 120 degrees stop. A register air temperature of about 110 to 115 degrees was thought desirable for most of the season. After the system was installed it was balanced to room temperature and dampers set accordingly.

An interesting feature of this system is the cost of operation. For a usual winter of 6,821 degree days, using anthracite coal costing $11.50 per ton and hand firing with all attendant care the heating bill was $207. With the new system using gas as a fuel and requiring no attention all through the year the cost last winter was $249. No records show what temperatures were maintained with the old system, but a check last winter showed uniform temperatures throughout all four apartments with the thermostat set for 74 degrees during the day and 68 degrees at night.

There Must Be Air For Combustion

By Wm. Scott — Bradfordwoods, Penna.

A TON of bituminous coal makes 16 tons of smoke, which nature kindly hoists out of the chimney, if given a fair chance.

In order to burn this ton efficiently, 15 tons of air must enter the furnace from the basement and the same 15 tons of air must enter the basement from outside through an opening provided or through incidental cracks and openings. But modern building practice tends to make the basement or furnace room more nearly air-tight, thus hampering the good work of nature by restricting the flow of air necessary for combustion and by reducing the pressure that forces the smoke out of the chimney. If the furnace room were entirely air-tight, neither draft nor fire in the furnace would be possible.

So, there must be air for combustion, and the heatman's problem is, how to get it?

A furnace with three square feet of grate area can readily burn 21 pounds of coal per hour, necessitating 315 pounds of air for efficient operation, which would mean 4200 cubic feet per hour or 70 cfm. At a velocity of 300 feet per minute, this air would require an open area of 34 sq. in.

Now, actual measurement of the draft intake of a furnace of this size, shows an area of 32 square inches, which is sufficiently correct and which shows the heatman's problem of combustion air has already been solved by the furnace manufacturer. All the heatman has to do is to measure the draft intake of the furnace and provide the same area for air to enter the furnace room or basement.

Lack of air in the basement introduces two detrimental tendencies, generally unsuspected: decreased combustion and lessened draft pressure, even to the point where smoke will puff out into the cellar rather than rise in a perfectly good flue.

On this score, many church jobs fail and the real reason is seldom discovered. In one such case, the furnace room was just large enough for the furnace and blower and was nearly air tight. The flue was outside and hardly high enough. The job was correctly figured, but the furnace smoked and would not heat the church.

The following remedy proved successful without increasing the height of the flue: Inside the furnace room a register with free area equal to that of the furnace draft vent was placed in the warm air duct. The object of this was to furnish air for combustion and to force the draft by the pressure produced. To compensate for this air, an equal amount of air was taken from the outside into the cold air duct. The remedy proved successful at a cost of less than five dollars. The furnace quit smoking and made abundant heat.

Pattern Development for

Air Conditioning Fittings*

By William Neubecker
Head Instructor
Sheet Metal Department, New York Trade School

Transition Elbows

OCCASION often arises when a transition elbow is required to fit in a limited space. An elbow of this kind is shown in the perspective view in Fig. 46.

Computing Dimensions

Here we have an elbow or offset where the riser measures 3½x12 inches and the depth of the feed duct is 8 inches. What width must the feed duct have so that its area will equal the area of the riser? Given riser $3.5 \times 12 = 42$;

$\frac{42}{8} = 5.25$. The feed duct will be 5¼x8 inches.

Knowing these dimensions, the plan and elevation can now be drafted.

Drafting Plan and Elevation

First draw any horizontal line as *A-8* in Fig. 47, 12 inches long. From *A* drop a perpendicular line 8 inches long as shown from *A to 14*. Now complete the rectangle *14-C-B-A* or 5¼x8 inches. Take the least distance or *A-14* and set it off from *8* to *D*. Using *D* as center and *D-8* as radius describe the quadrant *8-13* and intersect it by a perpendicular line dropped from *D* at *13*. Draw a line from *13* to *14*.

Add a 3-inch collar above *A-8* as indicated by *8-7-E-A*, which completes the elevation from which the plan is projected as shown by the dotted lines. Take the least distance *F-G* in plan or 3½ inches and set it off from *5* to *H*. With *H* as center and *H-5* as radius, describe the quadrant *5-2* to intersect the perpendicular line erected from *H*, at *2*. Draw a line from *2* to *1*. Below the line *5-1°* add a 3-inch collar as shown by *1°-X-6-5*, which completes the plan view.

*All rights reserved.

Patterns for Transition Elbow

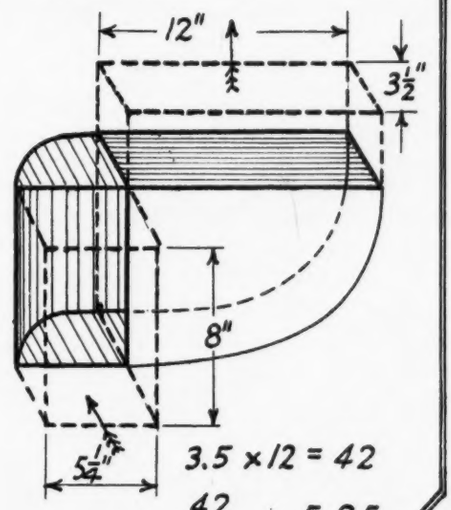
Space the curvature in plan in equal divisions as shown by the numbers *2* to *5*. In similar manner space the curvature in elevation in equal divisions as shown from *8* to *13*. The patterns can now be developed. For the pattern for the front, *X-1°-G* in plan, take a reproduction of *E-A-14-7-E* in elevation and place it as shown by *E-A-1-7-E* at the left. Take the depth of the collar *1°-X* in plan and set it off from *A* to *X* in the front pattern and from *X* draw the horizontal line *X-V* to intersect the vertical line erected from *1* at *V*.

Then will *V-1-7-E-A-X-V* be the net pattern for front. Now take the girth from *1* to *6* in plan and set it off in the *back pattern* as shown by similar number *1* to *6* on *1-V* extended. From *6* at right angles to *1-6* draw the line *6-Y* to intersect the line *A-X* extended at *Y*. Then will *Y-A-E-7-1-6-Y* be the net pattern for back, indicated by *6-1-F* in plan.

The top pattern is laid out by reproducing *X-6-1-1°-X* in plan, as shown by *X-6-14-1°-X* in the top pattern at the bottom of drawing. Take the height of the collar *A-E* in elevation and set it off in the top pattern as shown by *1°-E* and complete the rectangle *1°-E-N-14*. Then will *6-14-N-E-1°-X-6* be the net pattern for the top, indicated by *B-A-E* in elevation. Now take the girth of the curve *14* to *7* in elevation and set it off on the horizontal line *14-N* in the top pattern extended, as shown from *14* to *7*. Make the perpendicular line *7-W* equal to *N-E* and draw the line *W-E*.

Then will *6-14-7-W-1°-X-6* be the net pattern for the bottom, indicated by *C-14-7* in elevation. Allow edges for Pittsburgh or hammered lock on all patterns. Place single edges on all curved parts of the patterns and double lock edges on all straight parts of the patterns.

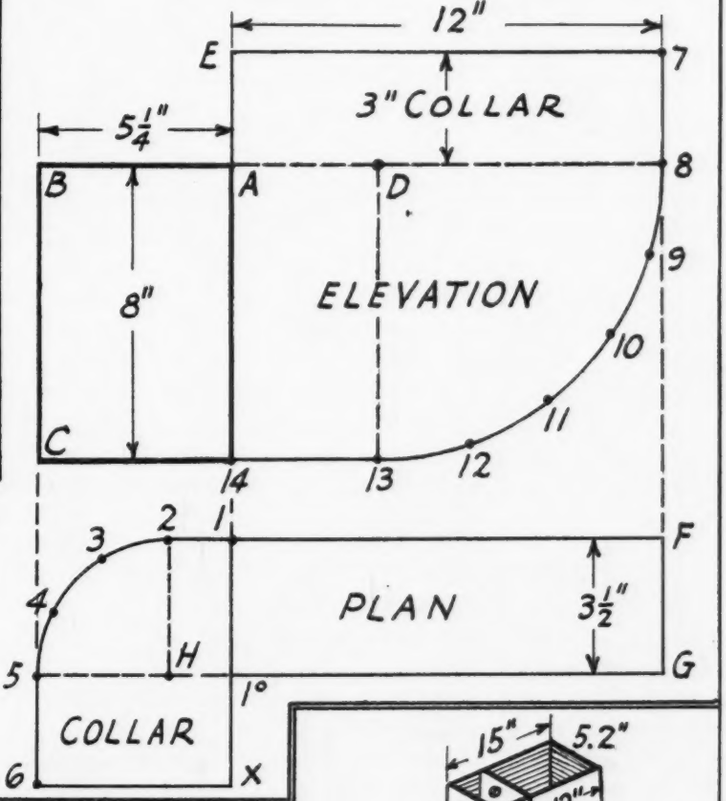
PATTERN-FOR-TRANSITION-ELBOW-IN-LIMITED-SPACE



3.5 × 12 = 42

$\frac{42}{8} = 5.25$

FIG. 46



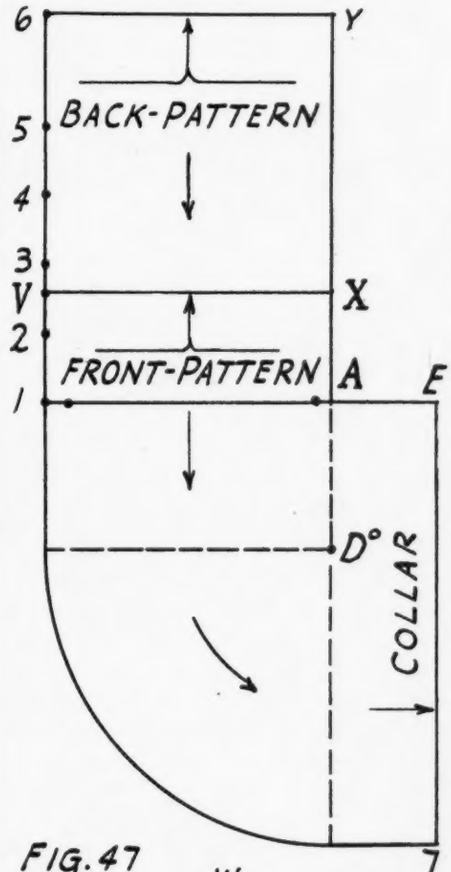


FIG. 47

PLAN ELEVATION AND PATTERNS

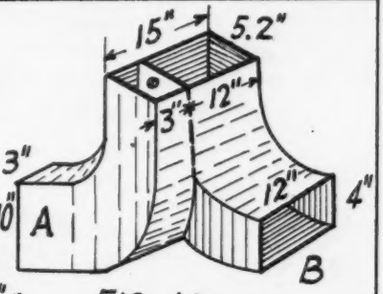


FIG. 48

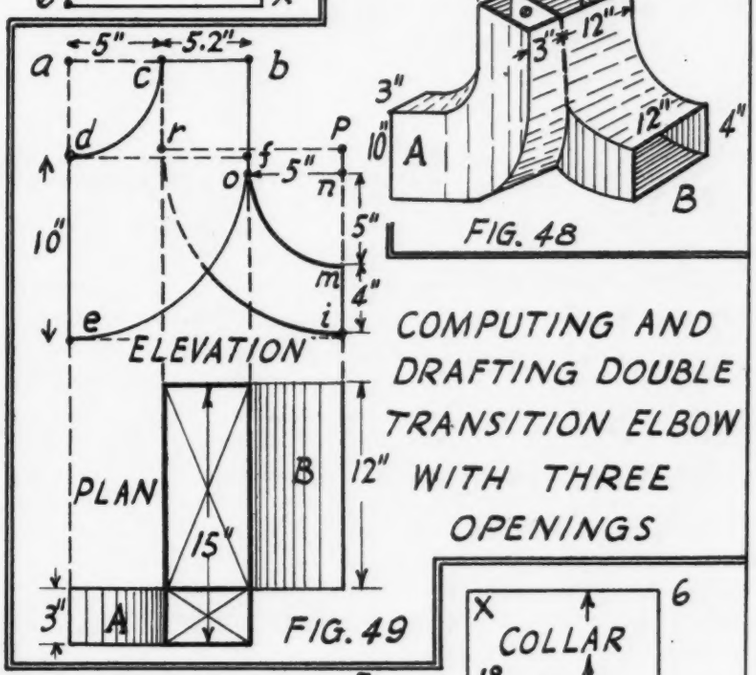
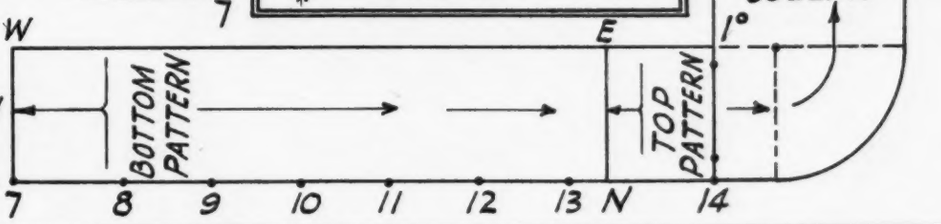


FIG. 49

COMPUTING AND DRAFTING DOUBLE TRANSITION ELBOW WITH THREE OPENINGS



Double Transition Elbow with 3 Openings

Fig. 48 shows a perspective view of a double transition elbow with three duct connections, each opening of a different size. The opening A, facing left, is 3x10 inches placed in a vertical position; the opening B at the right is 4x12 inches placed in a horizontal position.

In this problem the dimension of the top opening must have the combined area of both A and B. The length of the top opening is already given $12 + 3 = 15$; what must the depth of the top opening be? The method of computing is as follows: A is $3 \times 10 = 30$; B is $4 \times 12 = 48$;

$$30 + 48 = 78; \frac{78}{15} = 5.2 \text{ in.}; 5.2 \times 15 = 78 \text{ in.}$$

Knowing the correct dimensions for the three openings, the plan and elevation are drawn as follows: Care must be taken in finding the various center points with which the curves are struck, so that frictionless curves will result and equal areas will be maintained throughout the various elbows. Fig. 49 shows how this is accomplished.

Draw any horizontal line in elevation as *a-b*. Using *a* as center with the desired radius (in this case 5 inches) draw the quadrant *c-d* to intersect the perpendicular line dropped from *a* at *d*. Extend the line *a-d* and make *d-e* = 10 inches. Extend the line *a-c* in elevation and make *c-b* = 5.2 inches. Take the distance *a-b* and set it off from *e* as shown from *e* to *d*. Use *d* as center with *d-e* as radius, describe the quadrant *e-f* to intersect the horizontal line drawn from *d* at *f*; draw a line from *f* to *b*. Then will *b-c-d-e-f-b* be the cheek pattern of the elbow shown in plan by A, also shown by similar letter A in the perspective in Fig. 48.

As the throat radius for both elbows will be 5 inches, then draw the line *p-i* in elevation in Fig. 49 parallel to and at a distance equal to 5 inches to the right of the line *b-f* and intersect this line by a line drawn horizontally from *e* at *i*. This brings both elbows on a level line. From *i* measure off a distance of 4 inches as shown from *i* to *m* and make *m* to *n* equal to the desired radius, in this case 5 inches. Use *n* as a center and *n-m* as radius, describe the quadrant *m-o* to intersect the horizontal line drawn from *n* at *o*.

Add the distance of 5.2 + 5 or 10.2 inches and set it off from *i* to *p*. Using *p* as center and *p-i* as radius, draw the quadrant *i-r* to intersect the horizontal line drawn from *p* at *r*. Then will *c-r-i-m-o-b-c* be the cheek pattern for the elbow shown in plan by B, also shown by similar letter B in the perspective view in Fig. 48.

The heel and throat patterns for these two elbows are obtained as already described in previous problem. Below the elevation in Fig. 49 a plan view is shown, indicating the position of the two elbows, which is not necessary in practical work.

Getting Housewives To Sell Oil Burners

By Fred E. Kunkel

WHEN an oil burner dealer ran short of prospects he hit upon a good selling idea by running an ad in the paper offering to pay ten dollars for the names of prospects, viz:

$10.....Housewives, Canvassers.....I Pay $10
For Oil Burner Prospects I Sell, Phone 3355

He ran this ad in the classified section of the daily papers, but soon discovered it was not very successful when run under "female" or "male" help. He obtained excellent results, however, when put under "Male and Female Help Wanted," Classification No. 13.

At one time he ran his full business signature, but now uses only his telephone number and finds it just as successful. If the housewife has a friend, relative or acquaintance who wants to buy an oil burner, she naturally wants to make some extra money by furnishing the name of the prospect. She calls up immediately.

And this idea has been an excellent prospect getter to hot spots, resulting in from two to six prospects turned in on this two line daily ad.

"I worked this out so it would all come in one headline at the top in dollars," it was explained, "and that strikes the eye and appeals to their desire for money . . . that commodity called hard cash which is so precious to everybody and which nobody ever seems to be able to get enough off to satisfy. And ten dollars is a lot of money to every woman.

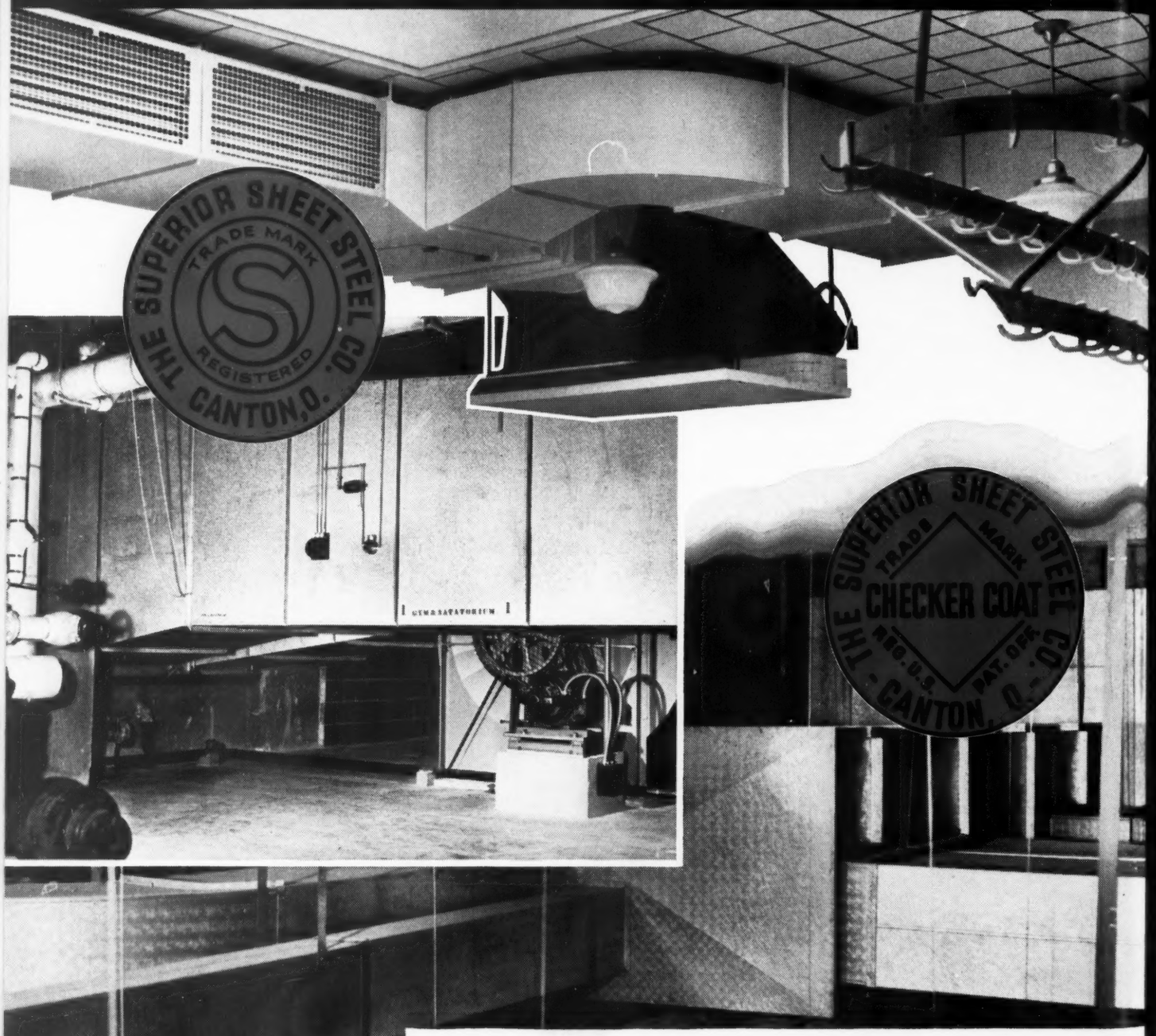
"But a word of warning. If you get under the wrong classification it is not nearly so good. There are very few ads under No. 13 and that makes your ad outstanding. There are too many ads under 'men wanted' and about the same under 'women wanted,' but under the combination I am frequently the only advertiser, which gives me an outstanding set up."

SHEET METAL SECTION

DEVOTED TO SHEET METAL CONTRACTING AND FABRICATING

The award goes to

Bison Blower Co.



The most interesting sheet metal jobs to come to our attention lately are these heating and air-conditioning installations by the BISON BLOWER COMPANY of Buffalo in a new high school building. SUPERIOR COMMERCIAL and SUPERIOR CHECKER COAT Galvanized sheets were used throughout on this outstanding job. Mr. Haas, President of Bison, selected SUPERIOR GALVANIZED sheets because of their ductility, tightness of bright coating and dependable uniformity.

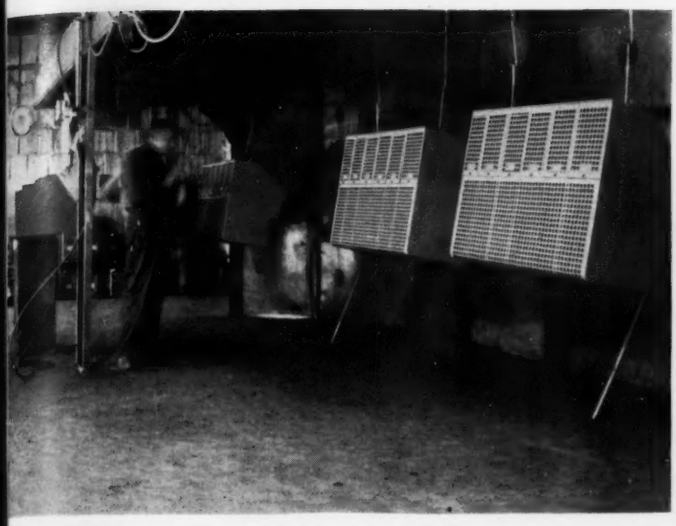
These important, "clear through" qualities have created a steady demand for SUPERIOR GALVANIZED sheets for attractive and long-life sheet metal construction.

THE SUPERIOR SHEET STEEL COMPANY • CANTON, OHIO

Division of Continental Steel Corp., U. S. A.

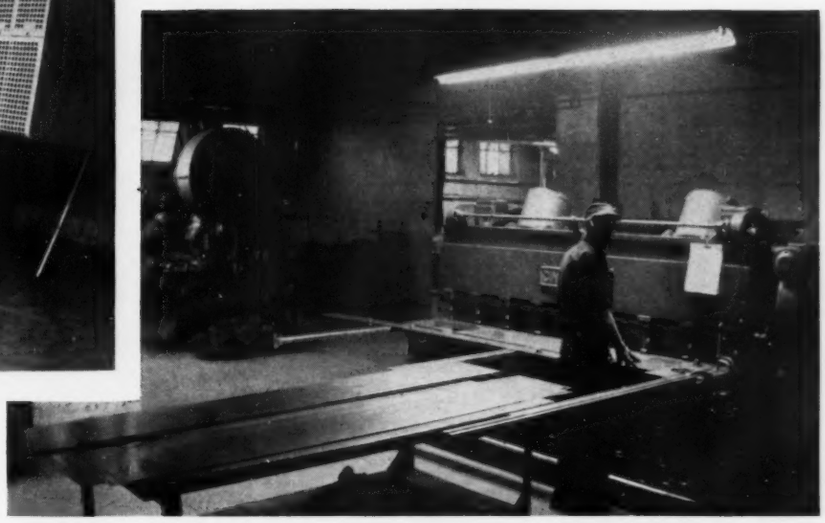
SUPERIOR

OPEN HEARTH STEEL SHEET



Right—8-ft. Cincinnati shear being set up by specialist in shop of Sherron Metallic Corp., Brooklyn, N. Y. Note fluorescent overhead lighting.

Left—Spray painting in one of three large open-front booths. Perforated plate and baffles, rear of booth, permit removal of paint surplus and impure air by exhaust fans behind booths.



Specialty Fabrication and Finishing Methods For a Volume Business

By R. C. Nason

IMPORTANT factors demanded of today's sheet metal fabricator are facilities for carrying out well co-ordinated programs involving quantity production of sheet metal articles; quality workmanship; economy and prompt delivery. This, in the opinion of P. H. Sherron, president of the Sherron Metallic Corporation, 1201 Flushing Avenue, Brooklyn, N. Y., summarizes his views of the activities of the concern which he heads.

This plant, one of the best known in the New York area, is engaged in the fabrication and finishing of sheet metal products on a volume basis, specificially large and small articles of a portable nature such as metal telephone booths, news stands, boxes, cabinets and auxiliary equipment for telegraph and radio use, vending machine housings, greeting card cabinets and products of a similar type, fabricated to customers' specifications.

In order to produce such a quantity of items, former methods and equipment have gradually been outmoded and supplemented by modern installations, until, at the present time, the plant is capable of handling quantity production as compared to former contracts involving but single or small quantity items.

The plant completely occupies four floors of a modern building, 300 feet long by 70 feet wide, embracing a total of 75,000 square feet and is fully provided with all the tools, machines and other equipment necessary for the efficient operation of the business.

General Organization of Shop

An important feature is a railroad siding connecting to an adjacent railroad yard, which is very essential in the delivery of carload lots of sheet steel, in various gauges, which are used in the manufacture of different products. These deliveries total approximately 5,000 tons per year and consist principally of cold and hot rolled sheet, together with miscellaneous material, such as alloy sheets, furniture steel, long terne, angle, rod and bar stock.

As a general procedure, sheet metal stock is conveyed to the basement for layout work, shearing, punching, die forming and brake operations. This floor is equipped with power driven machines, including shears, bending brakes, rolls,

punch and die presses, nibblers, circular saw and associated equipment for cutting, stamping and forming sheets up to 11 gauge and eight feet long.

After forming, the articles are taken by elevator to the first floor, which is almost entirely allotted to electric spot welding, arc and gas welding and brazing. For these operations, of course, there is provided a full complement of modern electric and oxy-acetylene welding machines of various types. In this section, all grinding and polishing is done and, where necessary, the preliminary assembly of various parts.

Finishing Is An Important Duty

In proper order, the articles are next carried to the third floor, where all finishing operations are conducted. The Finishing Department occupies the entire floor and is provided with every facility for the application of synthetic enamels and lacquers. This includes baked synthetics, air drying enamels and lacquers, wrinkle finishes, sound deadening treatments, striping and silk screen applications, all of which may be in color or combination of colors according to customers' specifications.

The equipment for this work includes three large spraying booths, an electrically controlled, gas-fired baking oven with a capacity of 1,400 cubic feet and an overhead track system about 2,000 feet long, for the efficient handling of parts during the finishing processes. Sanding machines, stripping tanks and degreaser or vapor cleaning tanks, insure adequate preparation of articles for finishing. A recent installation of a motor-driven conveyor provides for the finishing of small parts by the dipping process at the approximate rate of 8,000 to 10,000 parts per day. It can readily be seen that finishing, as regarded by this concern, must be equally comparable to quality fabrication.

After finishing, the articles are then routed to the second floor, where they are assembled, inspected and packed for shipping or for storage, subject to customers' orders. When ready for shipment, the merchandise is then either carried to the railroad siding or to a loading platform for delivery by truck.

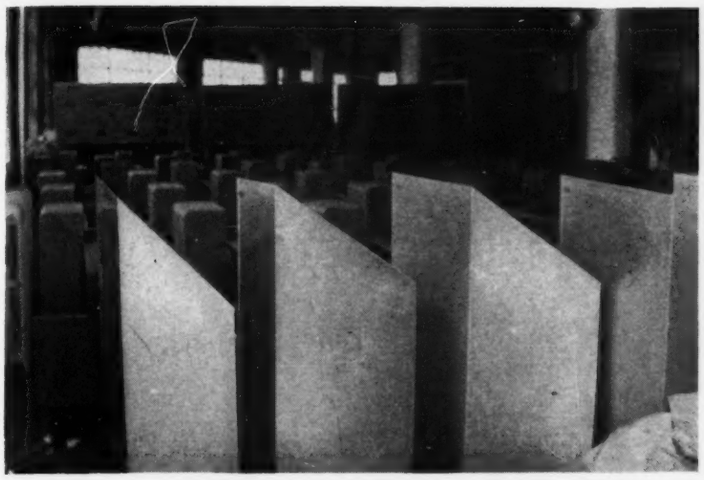
Supplementary Departments

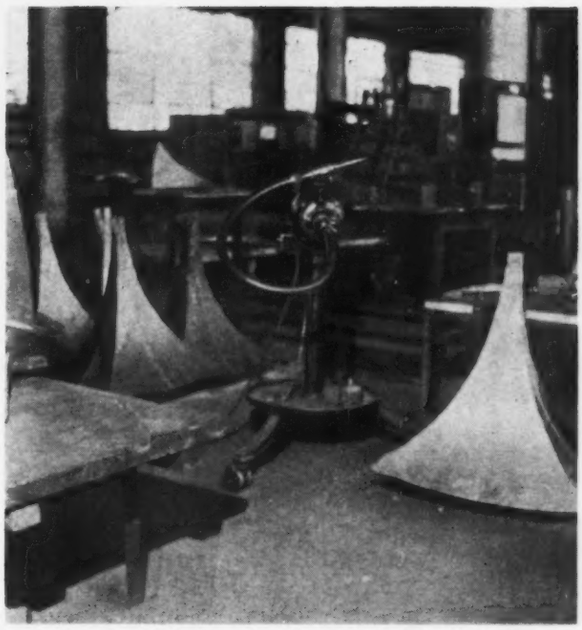
A recently added division, also on the second floor, now engages in precision wiring on telegraph transmitting and receiving tables, trunk and line selecting racks and other smaller units such as amplifiers, chassis and similar electrical parts.

Typical of the important work recently executed by the new division, was the precision wiring of three hundred and fifty telegraph transmitting and sending tables mentioned above and which are vital elements in telegraph central office installations. The fabrication and finishing was, of course, done by the respective departments handling this part of the job. These tables were two different types and incidentally,

Right — Soldering steel webs into loud speaker horns. Interior dividers, or webs, increase sound volume and clarity. Sherron Metallic Corp., devoted considerable research to this product.

Left—Mechanic using portable grinder to remove uneven surfaces in steel cabinet preparatory to finishing operations.





Above—Steel cabinets awaiting finishing touches in storage area of the plant. Right—Partially completed loud speaker horns of long terne for motion picture sound application. Units require a large number of hand operations to achieve perfection.

weighed one hundred fifty and five hundred pounds each.

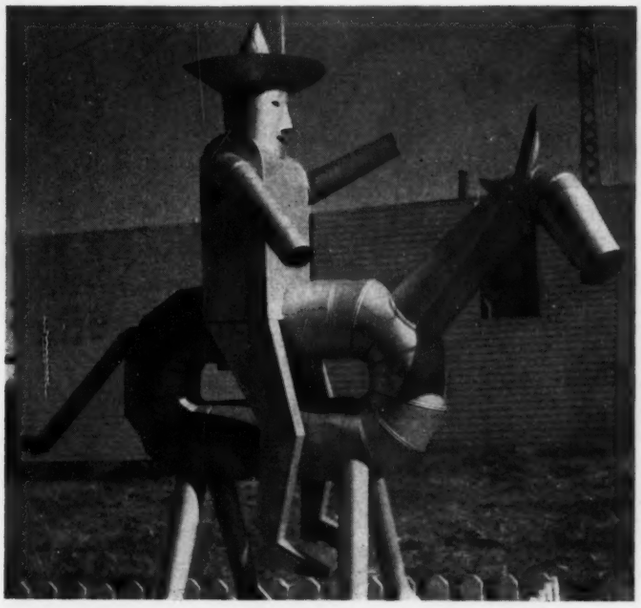
After finishing, the tables were then transferred to the wiring division for the installation and precision wiring of the various delicate relay switches and other parts necessary for this type of equipment.

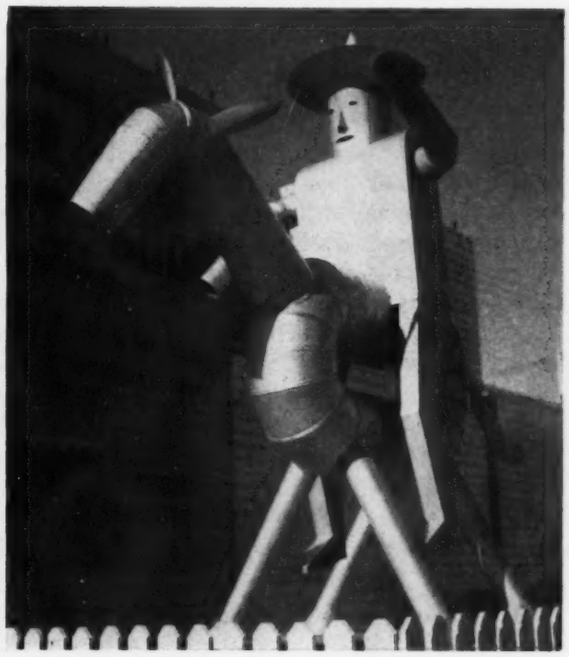
In considering all the various phases of work carried out by this company, which are quite numerous, it must be realized that an efficient organization is of paramount importance and in this connection, it may be mentioned that the personnel of the executive, engineering, clerical and shop forces, represent the capable qualities required for the proper functioning of each, and in the last analysis, it simply means co-operation and teamwork.

Metal Man on a Metal Horse

By C. E. Avery

SHEET metal contractor Dan Marelich of San Bruno, California, advertises his shop with the horse and rider shown in the photographs. Both horse and rider are fashioned from furnace pipe, stove pipe, eaves trough and several forms of rectangular metal construction common to every shop. The horseman has become a familiar land-mark to residents of San Bruno, identifies the shop and unmistakably spots its location. The parts of which the horse and rider are made remind customers and prospects that proprietor Marelich is able to do all their sheet metal work. The "statue" is covered with aluminum paint and is protected by the picket fence.





Training Men For Sheet Metal Work Under Rearmament Requirements

By Ernest E. Zideck

Instructor, Technical School, Jackson, Michigan

In considering any course of instruction and training in sheet metal under our rapidly changing conditions of work in the average sheet metal shop and in the larger establishments in which quantity production methods apply, we should be governed, primarily, by what the trainee will be required to do on entering the shop or the establishment.

Contractors and foremen in charge of work in shops and manufacture will agree that they'll have little use for men who know a smattering of everything, but can not perform knowingly and satisfactorily on either the shears, the brake, the assembly bench of the final assembly or installation. There undoubtedly is demand in shops and factories for men understanding the principles of lay-out and able to work from blue prints. But the greater demand today seems to be for men versed in shearing and forming, in the handling of tools in flanging, seaming, riveting and the other methods of sheet metal working.

10 Mechanics Needed for Each Layout Man

For one man versed in laying out the work from specifications or blue prints or both, ten men will be required to convert the layout into that many units, be it gutters, skylights, ducts and fittings, or be it diverse manufactured cabinets, housings or auto and plane bodies. Contractors and foremen will agree, accordingly, that although they prefer men who understand layout and are capable of working from blue prints, they'll hire men who may be posted at either of the machines or the benches and prove efficient in quantity work.

Heretofore in sheet metal work instruction and training such as has prevailed in the Public School Vocational System, the trainee has been led to lay-out minor items and work them, by means at hand, to their completion. An intelligent student who liked the work and applied his mind to it progressively developed into an individual capable of constructing for himself, from first to last operations, various small utensils and trinkets.

Not that the above accomplishments have been of no good. They have. They introduced the trainee into the intricacies of the trade, acquainted him with the principles of layout and with the uses of the tools. But this type of graduate was (and still is) considered of lesser value in a shop or a factory than is a young man apprenticed on the job or a man having had one year's practical experience.

Present Training Outmoded

Why is it so? Because the graduate from the usual Vocational Training Course as administered to him by the well meaning, but handicapped instructors in the Public School System, has had no instruction whatsoever as to the "value of time" and in profitable, quick and unmistakable results producing work.

An illustration: A contractor doing air conditioning work for an Ohio school building has dispatched the tools and the men to do the work "on the job." He sent also a recent technical school graduate to lay-out the work for the gang. The result was that the foreman and the odd ten men stood around for hours waiting for the conscientious young man observing all the rules he learned at school, trying to make a marking pattern for a square duct elbow. At the end of several hours the foreman took a piece of chalk and a carpenters square and chalked the pattern on sheet metal, telling the perspiring lay-out man that he better pack and go back to the shop where they might find work for him to do.

The foregoing illustration applies to thousandfold other instances where the foremen despaired of work done by purely academically trained young men. The point is: the present day in-

struction given the young men in the class rooms is lacking the elements of vision, of understanding of work, of comprehension that work must be done, quick work at that, to pay the wages, the involvements and the enterprise.

The writer has had various instruction experience, one such having been with the Federal Board for Vocational Education in New York City, rehabilitating soldiers returning from France. Other experience included training "green help" in factories. Although trainees ranged in age from seventeen to forty years, the writer has had no difficulty with the trainee material. The difficulty was rather with the established routine of instruction.

It Can Be Done with Poorest Material

On August first, last year, the writer took charge of a class of WPA and NYA young and older men enrolled for sheet metal work training under the National Defense Program. This Program called for a "short course of training enabling the trainee to do adequately good work in sheet metal in either the shop or in National Defense Industries." With this broad object in view the instructor was given authority to introduce a course and methods of instruction and training as would be most effective of the desired results.

The trainee material in the present instance was not of the best. The WPA workers were men out of a regular job for years, shifted from one project to another, in that process of changing jobs and bossed over by so many (mostly irresponsible) appointees to office, losing direction and harboring but the one thought: of putting in that many hours and getting that many dollars for it. The NYA boys were largely the product of the prevailing "goodfellowship" practiced by their respective supervisors. Neither class was interested in learning enough to go out and earn wages, or, in some instance, the elder men had lost hope that they ever would be able to get work and earn wages.

Sheet Metal Work Is a Good Trade

The very first thing the present instructor has done was to lecture to the trainees about sheet metal work. He dwelt on the numerous phases and branches of it, showing the men that there is daily more and more work to do in the line and more and more opportunity for getting employed. He described the various work done by the trade, always leading back to the principles embodied in sheet metal work, no matter what the job be. He succeeded in getting the men interested in metals, their gauges, in the manner of working one sheet or another, doing this or that line of work. Soon he was able to give the men work to do, one group starting at the layout, the other group doing all the cutting, another doing the forming, a third working on the benches, a fourth assembling and binding, a sixth doing miniature installations. Soon there was produced an imitation of a regular air conditioning outfit, a miniature house built with a furnace and all the ducts in it, and a regular air-exchange system built and installed in the school's electrical class room and shop.

Rotating Work Is Essential

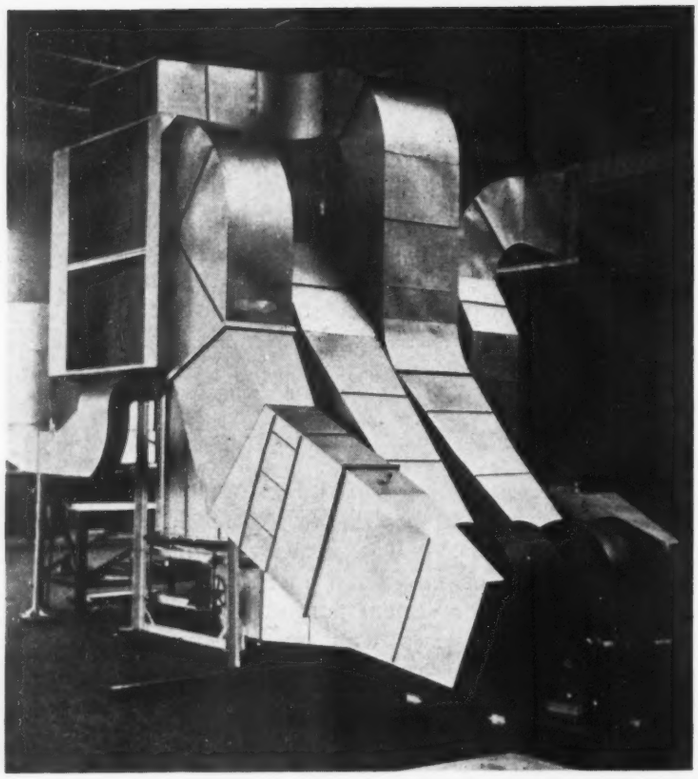
Groups were changed periodically, so that each of the trainees worked on a number of machines and handled the tools. Tool boxes were made, regular eavetroughs made and installed, pipes, ducts and fittings for various purposes produced. Students from other class rooms ordered furnace pipes and chimney tops and various home utensils. The school building soon was equipped with sheet-metal-made goods, from trays to regular school lockers. Outsiders commented on the various produce, seeing no difference between it and goods obtained in the legitimate sheet metal shop.

The above in itself would not constitute a noteworthy accomplishment were it not for the accompanying fact that the trainees, with a very few exceptions, had learnt enough in the short three months of training to feel at home in any sheet metal shop or the sheet metal department of a factory and to listen knowingly to the foreman or group leader assigning work to the new employee and doing it—slower perhaps than the older employee would be doing it, but just as well.

Trainees Have Succeeded

Several of the men were sent out to work for air conditioning contractors and in factories during the three months period. They have come back to the class room boasting to the stay-behinds of what they are doing and what wages they are getting. One of the trainees lays out ducts in a Detroit shop. Another is assistant foreman in a local factory. A third does furnace installations in the neighborhood. A fourth works on a large air conditioning project just outside of Detroit. Eight of the trainees are scheduled to commence work this month, doing shearing-cutting, braking-forming, flanging and assembly work in sheet metal production.

What the present writer wants to emphasize in this article is not so much what has been accomplished, with limited means and not quite first rate trainee material in the above instance, but WHAT could be accomplished in every instance, if the Public School Vocational System would change from orthodox, but antiquated courses of instruction, to such training as would produce workers wanted in the shop and the factory.



The all-welded dehydrator and the complicated duct system which conveys air to unit and from unit to rooms served. All seams are welded; patterns were cut on the job; welding saved some $300 as compared with riveting and seaming.

Arc Welding a Silica Gel Dehydrator For Press Room Dehumidification*

By Howard H. Tunis*

RESEARCH in paper shrinkage, variation in wood mounting block thickness, hardiness of ink rollers and time of ink drying as affected by atmospheric humidity, had shown the necessity for dehydration of the air in the press room during the summer months. Since refrigeration was not needed, the purchase of a silica-gel dehydrator was approved, but no adequate equipment was offered. The writer having spent several years in designing silica-gel air conditioning plants, had definite ideas regarding the type of equipment required, so the portion of the task assigned to him was that of mechanical design, supervision of fabrication, installation and operation. The plant has now been in successful operation for several years.

In the dehydrator described in this paper, having a total weight of about two tons of steel, over 1800 linear feet of arc welding consisting of nearly 1500 separate welds, was required.

The relatively low cost of 23 cents per foot of weld was due in large measure to the fact that more than one-half of the linear feet was on the duct work where the welding was nearly all edge joints of 20-gage metal and averaged over 2 feet to the weld.

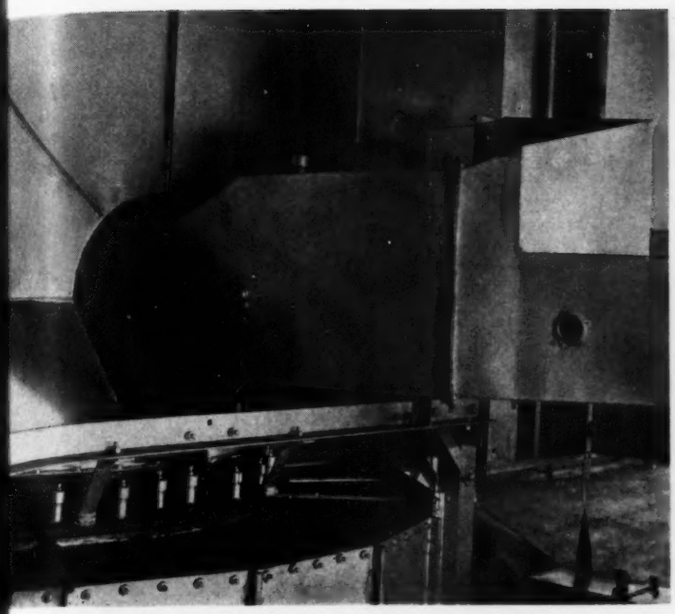
The dehydrator, (see photographs), consists of a drum made up of 20 segments, each of which has 5 shelf-like screen baskets on which is placed the sand-like silica-gel. This drum might be likened to a 5-layer cake cut into 20 slices; the cake having a round hole in the center such as was made by the old-fashioned cake pan.

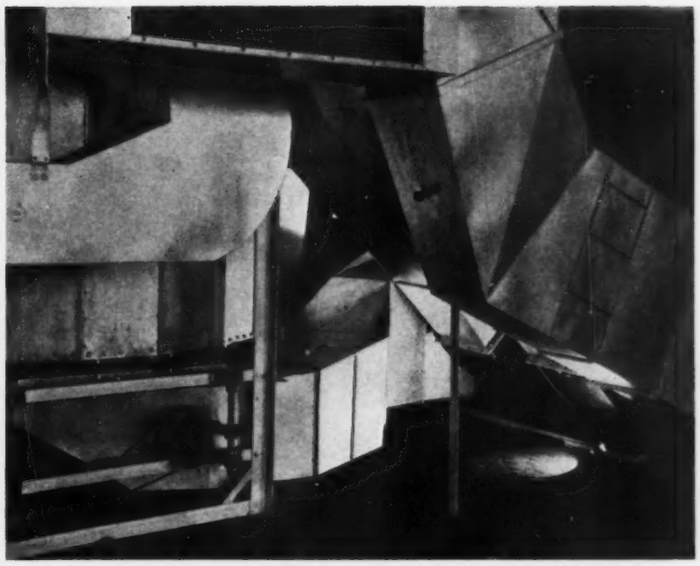
How Dehydrator Works

In operation, the drum rotates on a vertical shaft, the end bearings of which are held in place by a structural steel framework. This framework also supports the gas-tight seals, at the top and bottom of the drum which direct the air and the heated gases through the proper segments and thus through the gel layers. Extending in both directions from the seals is a complicated network of flues made of 20-gage auto-body plate which connects with the air filter, (see Fig. 3), the fans, the gas furnace and the cooler, and from the latter, diversion dampers direct the outgoing dry air into one (or both) of two rooms to be dehydrated. These dampers are operated by the humidity controls actuated by humidistats located in the rooms.

Air entering the top, (see Fig. 4), of the adsorber drum near its center, is deflected toward the circumference whence it diverges and passes through one of the five layers of silica-gel. These layers are supported by the gel baskets which consist of horizontal screens bolted to light angles spot welded to the sides of the segment. Below each screen is a baffle that separates the dry air passing out from the bottom of each screen from

Data and illustrations from award study submitted to the James F. Lincoln Arc Welding Foundation by Howard H. Tunis, research engineer, Waverly Press, Inc., Baltimore, Maryland. In its $200,000 Industrial Progress Award Program, which closes June 1, 1942, the Foundation is offering 458 awards from $100 to $13,700, for reports of advances and improvements made by application of arc welding in design, manufacture, fabrication, construction and maintenance.





The two photographs above show details of the duct work and typical standing seams which were spot welded for position and then full welded. Below is the dehydrator drum containing the silica-gel trays.

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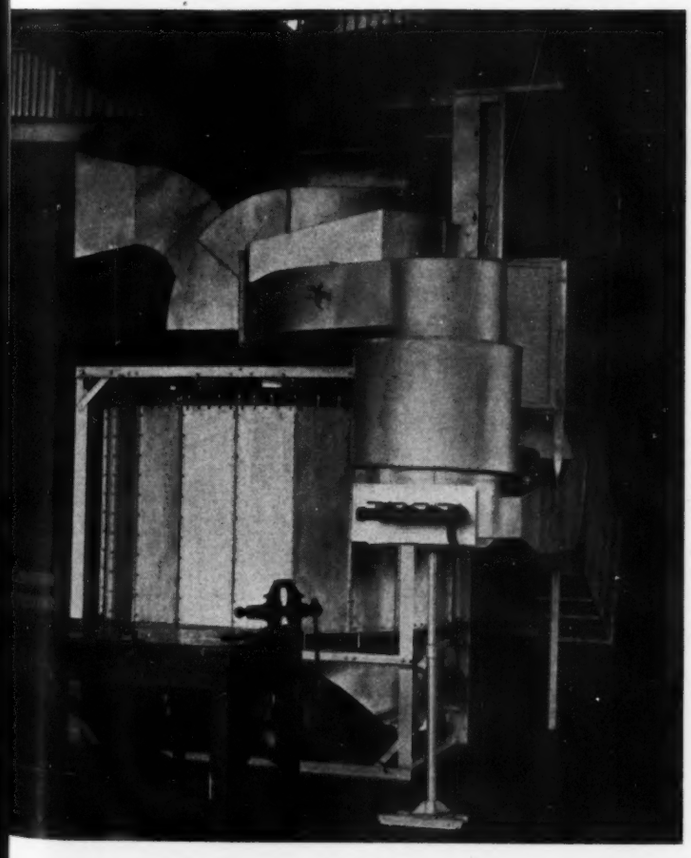
mixing with the wet air entering the top of the gel-bed below. In addition, the outer and upper part of each baffle forms the outer or wider end of the gel basket, while the inner or lower part forms the inner or narrow end of the basket next below.

It would be next to impossible to weld these baffles in one piece to the sides of the segment, even if an air-tight joint were not required, due to the opening on the narrow side of the segment being less than four inches wide, which would barely permit the insertion of an electrode. We therefore, made each segment in right and left halves, spot-welding the light gage gel-screen angle supports and half baffles to each side. The baffles had their edges broken at right angles forming flanges on the center or parting line of the segment; thus there were two parallel edges projecting one-half inch in the direction from which the electrode would enter. This projection was sufficient to allow for a slight bending so that the edges would be in contact and by fusing them together an airtight joint would be made. At the same time an expansion joint would be formed to allow for the expansion stresses caused by the repeated heating and cooling of the activation cycles.



The narrow back plate and the top and bottom plates each had flanged edges which when welded as an edge joint to the straight edges of the sides made a smooth surface, allowing close contact to the sides of the adjacent segments. In the back plate were bolt-holes which permitted the segment to be secured to the pulleys or drums on the vertical shaft on which the adsorber rotates.

The rims or hoops of these drums were made of plate in which bolt holes were drilled before bending. Small location pin holes were also drilled which would hold the spokes in place while welding. All of the arc welds of the spokes were made with generous fillets, as a relatively large shear was developed at their connections with the shaft and rim, due to the loaded absorber. Gusset plates welded to spokes and shaft, not only reinforced the spokes in the direction of rotation, but also increased their weight-bearing strength.

The vertical shaft was a piece of two-inch

(Continued on page 134)

Product Finishing

Measuring and Controlling Viscosity

By W. G. Sheane
Chemical Engineer, General Electric Co.

IN ORDER to obtain a consistently good organic finish, it is necessary to maintain control limits on the material as well as on the equipment used. Of no less importance than baking schedules, spraying pressures, etc., is viscosity—that characteristic of lacquers and enamels which influences to such a great extent, their sprayability, flow-out and build.

The role of viscosity is sometimes not thoroughly understood, yet it is quite simple if it is thought of as the reverse of fluidity—a highly viscous material being one of low fluidity and vice versa. In terms of the laboratory, viscosity is the internal frictional resistance offered by a fluid to change of shape or to relative motion of its parts. Generally speaking and from the practical standpoint, materials of low viscosity will spray easily and flow well due to their fluid condition. On the other hand, high viscosities lend themselves to building, that is, they will allow the application of comparatively thick films without sagging.

Factors Influencing Viscosity

The best viscosity for a particular method of application will depend on the amount of solvent added, the temperature, and the nature of the finishing material and thinner. Only the first two points are of importance to the finishing superintendent, inasmuch as they are the ones directly under his control.

After a suitable material has been selected, the proper solvent is ordinarily purchased from the paint manufacturer in view of his knowledge of the formulation. This is the usual procedure and it is a safe one. The kinds of resins, pigments and solvents used comprise a chemical problem which is one best left in the hands of technical specialists.

All other factors remaining constant, the addition of increasingly large amounts of thinner will progressively reduce the viscosity of a finishing material and, at the same time, produce a decrease in the concentration of non-volatile solids. However, the relationship between viscosity and the amount of solvent added is not a direct one, which may be explained by saying that the addition of two volumes of solvent does not always produce a solution half as viscous as that obtained by the addition of one volume.

As a matter of fact, it will be seen by the chart

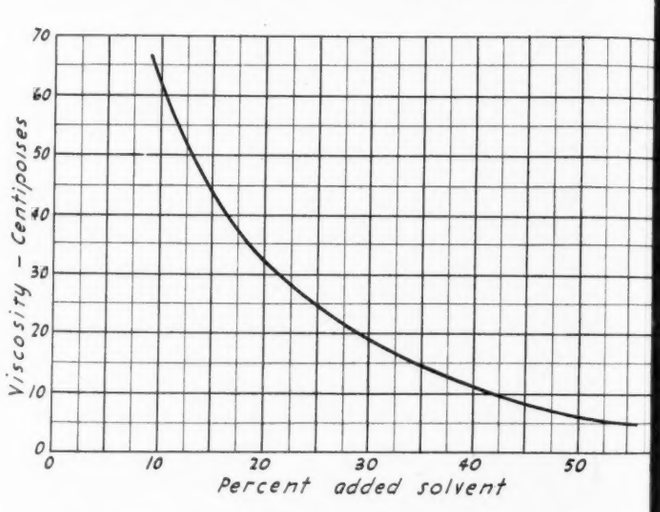


Fig. 2—A typical viscosity-solvent-addition curve for a baking synthetic material.

in Fig. 2 (a typical viscosity-solvent-addition curve for a baking synthetic) that the rate of fall of viscosity decreases considerably with the addition of increasing amounts of solvent. For example, the change in viscosity between 10 per cent and 20 per cent solvent is approximately 31 centipoises, whereas the change between 40 per cent and 50 per cent is only about 5 centipoises.

Within limits dictated by such factors as the evaporation of solvents and the stability of the material under heat, a range of viscosity may be obtained without changing the solvent content by raising or lowering the temperature. Higher temperatures, by allowing more mobility within a solution, will produce a decrease in viscosity and, conversely, lower temperatures tend to produce a thick viscous solution. This procedure, unlike the addition of solvent, does not alter the non-volatile solids content appreciably and, as

a direct result, the hiding power remains, nearly constant. The effect of temperature on the viscosity of a baking enamel is shown by the chart in Fig. 3.

Measurement of Viscosity

Control of manufacturing methods by rule of thumb has no place in industry today. Testing the vicosity of finishing materials by pulling a paddle out of a pail and watching the material run off is as completely outmoded as the testing of the pH of plating solutions by tasting with the finger.

The use of the hydrometer is a step in the right direction, but it does not go the whole way for a number of reasons. First, it is not true that the specific gravity of a paint mixture and its viscosity are directly related. The viscosity of a finishing material may vary considerably, due to the use of a different solvent or because of temperature fluctuations, yet no appreciable difference in specific gravity can be detected by a hydrometer. Further, hydrometers are not sensitive to changes in thinning ratios to the degree exhibited by viscosimeters. Consequently, variations in sprayability and hiding power can exist without any great change in specific gravity being indicated by hydrometric methods.

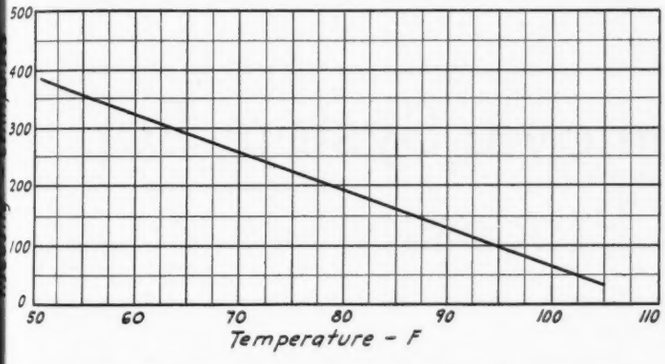


Fig. 3—Chart line shows the effect of temperature on viscosity of baking enamel.

Viscosity Measuring Instruments

Many instruments for the measurement of viscosity have been proposed and used, including the Saybolt, Engler, MacMichael, Ford, Cochius and others. Some of these are extremely accurate and require considerable skill in the use of delicate equipment. Others are characterized by their simplicity and practicality, and are ideally suited to finishing control. Perhaps the best known in organic finishing are those using the falling sphere, the bubble, and the flow principles.

The falling sphere method makes use of the fact that a steel ball requires more time in falling a given distance through a heavy, viscous fluid than through the same distance within a light, less viscous fluid.

The bubble method is based on the time necessary for an air bubble of definite length to rise in a slender sealed tube of standard dimensions, filled with the fluid to be tested.

The flow method measures the viscosity as the time necessary for a definite volume of fluid to pass through a standard orifice.

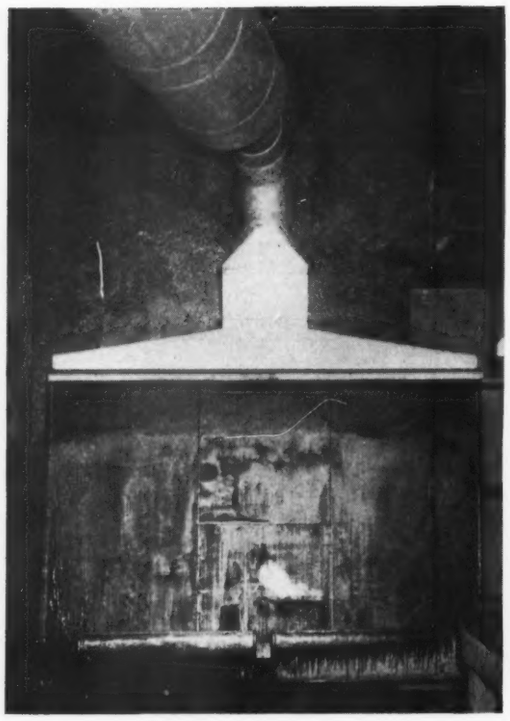
Of the three, the flow method has found wide use in the form of the well known Ford cup, Zahn cup and others. The Zahn cup, which comes in four orifice sizes, is attached to a loop handle and may be used directly at the scene of operations. It is filled by immersion to its top, the viscosity being measured by the time required for emptying through the bottom orifice after a quick withdrawal from the material. The cup method possesses the advantages of being inexpensive and easily used on all types of paints, both clear and pigmented. Zahn cups may be kept immersed in the fluid and withdrawn when a reading is required, see illustration Fig. 1.

Fig. 1—Testing viscosity of a finishing material with Zahn cup and stop watch.

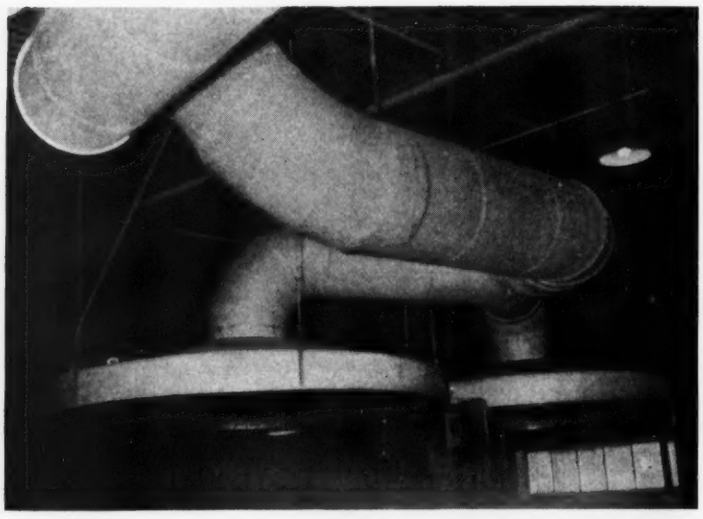
Practical Considerations

As has been indicated, viscosity can be adjusted by the addition of varying amounts of solvent or by temperature regulation. The ideal situation calls for both the maintenance of a constant temperature and an invariable thinning ratio after the proper viscosity has been determined, although the control of viscosity by temperature alone has the distinct advantage of not changing the thinning ratio and the solids content of a finishing material, unfortunately

(*Continued on page* 82)



Left—Shallow, upright "coater" hood with exhaust slot across the top and bottom. See Fig. 2 for construction. Below—Twin hoods above revolving tables showing method of suspension and lapped and riveted pipes. Hood construction shown in Fig. 1.



Fume and Mist Removal System For Engraving Processes

IN THE photo-engraving department of the McCall Publishing Company's Dayton, Ohio, plant, Rieck Sheet Metal Company, Dayton, installed, and Wm. R. Funk designed and engineered, the fume removal system shown in the accompanying photographs and sketches. The photo-engraving room is located in one corner of the building and has large doors to the main plant so that air removed by the exhaust system can be replaced by air from the plant, thus keeping the photo-engraving room under a slight vacuum which keeps fumes from reaching other parts of the building.

Three sources of fumes are vented. In one stage of making an engraving plate, the plate is treated with acid and processing is speeded up by revolving the treated plate on a circular table. There are two of these spinner tables, side by side, as pictured. As the plates are rapidly revolved, an acid mist is thrown off. This mist is injurious to employees who must stand by the table to watch the progress of the work. The mist is also accompanied by fumes and both fume and mist are slightly heavier than air.

The problem here, then, is to catch the mist and fumes around the edge of the tables and to do this a high air velocity is required to lift fumes and mist into the hood which must be above the table in order to permit working around the table.

The hood, as constructed by Rieck, is shown in the sketches. It consists of a circular top or outer flat cone built up of numerous gores lapped at the joining seams and riveted. The outer edge is flanged, as shown, and a separate edge piece is connected with a Pittsburgh lock to the flange of the top. The edge hem is stiffened with a heavy wire.

Hood and Slot Construction

Since the flow of fumes and mist is toward the outer edge of the table, the exhaust opening is a continuous slot around the outer edge of the cone. This slot is obtained by placing an inner and parallel cone within the outer hood. The inner hood is spaced from the outer by 1 in. by ⅛-in. band iron spacer bars, top and bottom. The hood is made of 20-gauge galvanized iron.

A velocity of 2,200 fpm is maintained through the slots—this speed having been found sufficient

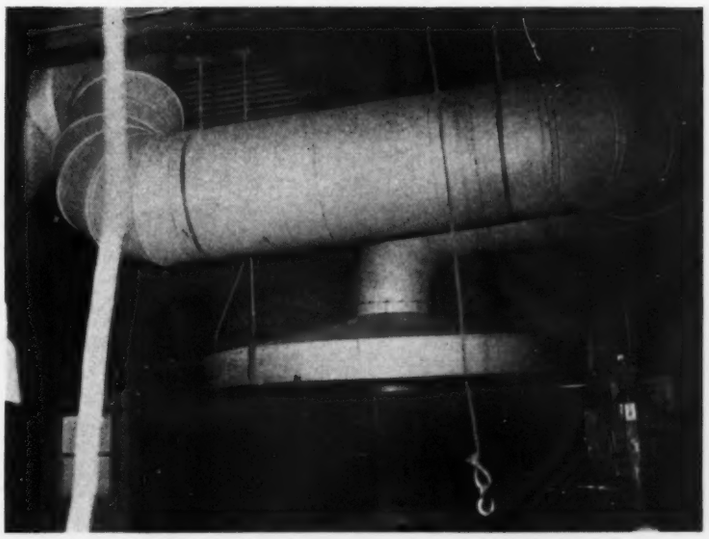
to carry off fumes and mist and keep the air above the table edge clear and pure.

The two hoods connect, as shown in sketches and photographs, with a round pipe system which connects with a fan in a monitor and exhausts directly out of doors through louvers. The pipe sections are lapped and riveted and made of 20-gauge galvanized iron.

Exhaust From Flat, Upright Hood

The third source of fume production is the "Coater" cabinet, where a coating is applied to the plates before the plates are placed on the revolving dryers. In the coating the plates are set on edge, so the cabinet is quite high and shallow (see photograph) and the workman must stand against the open front of the cabinet.

Two exhaust slots are used here. Across the front, top edge a continuous 6-in. slot catches all rising fumes. Across the bottom, front edge, another continuous 6-in. slot catches all falling fumes so that the operator may stand almost in



Above—Another view of hood above revolving table and main exhaust line leading to exhaust fan located in the face of a roof monitor. The photographs show mist rising from table into slot leaving rim clear of fumes and mist.

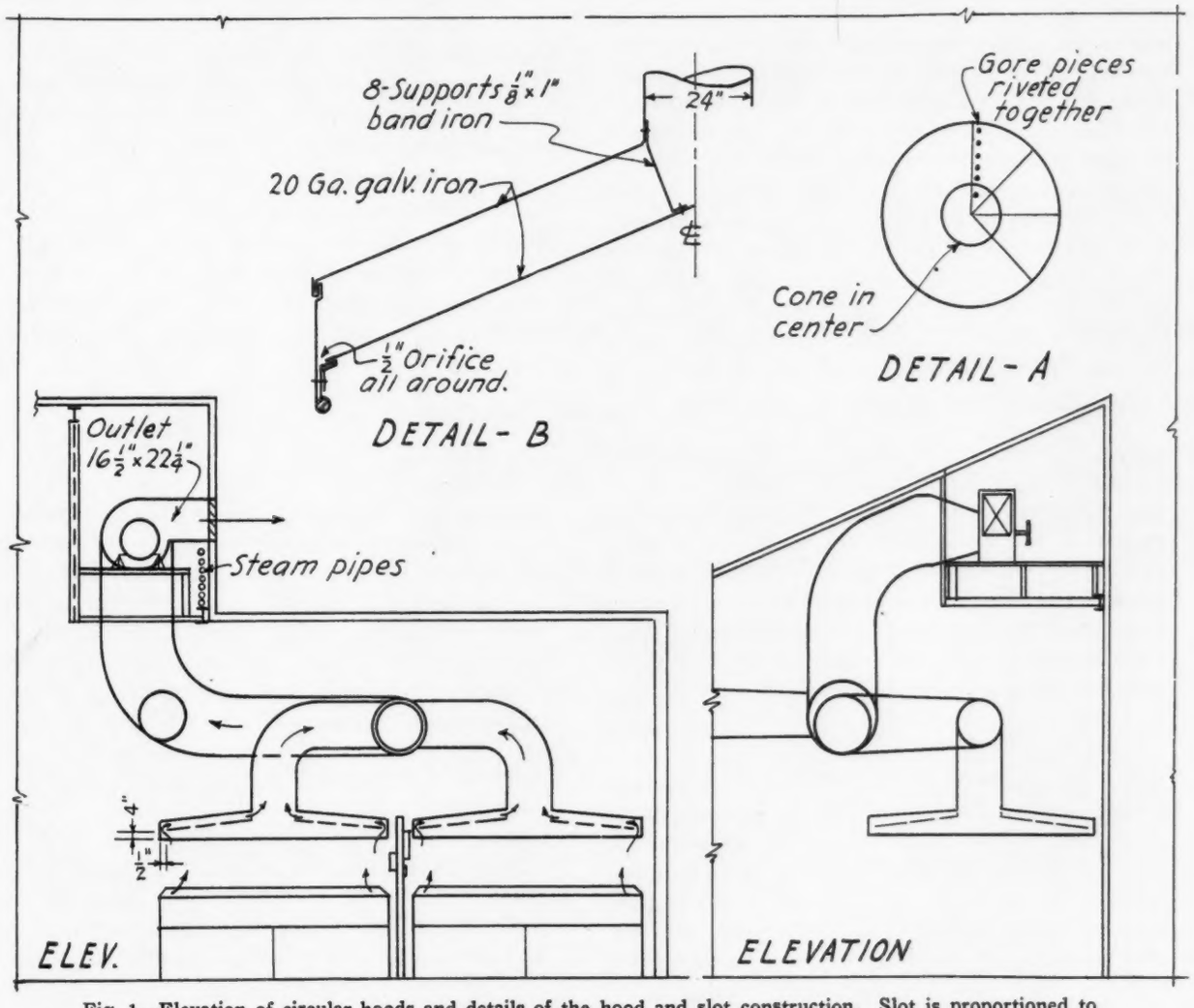
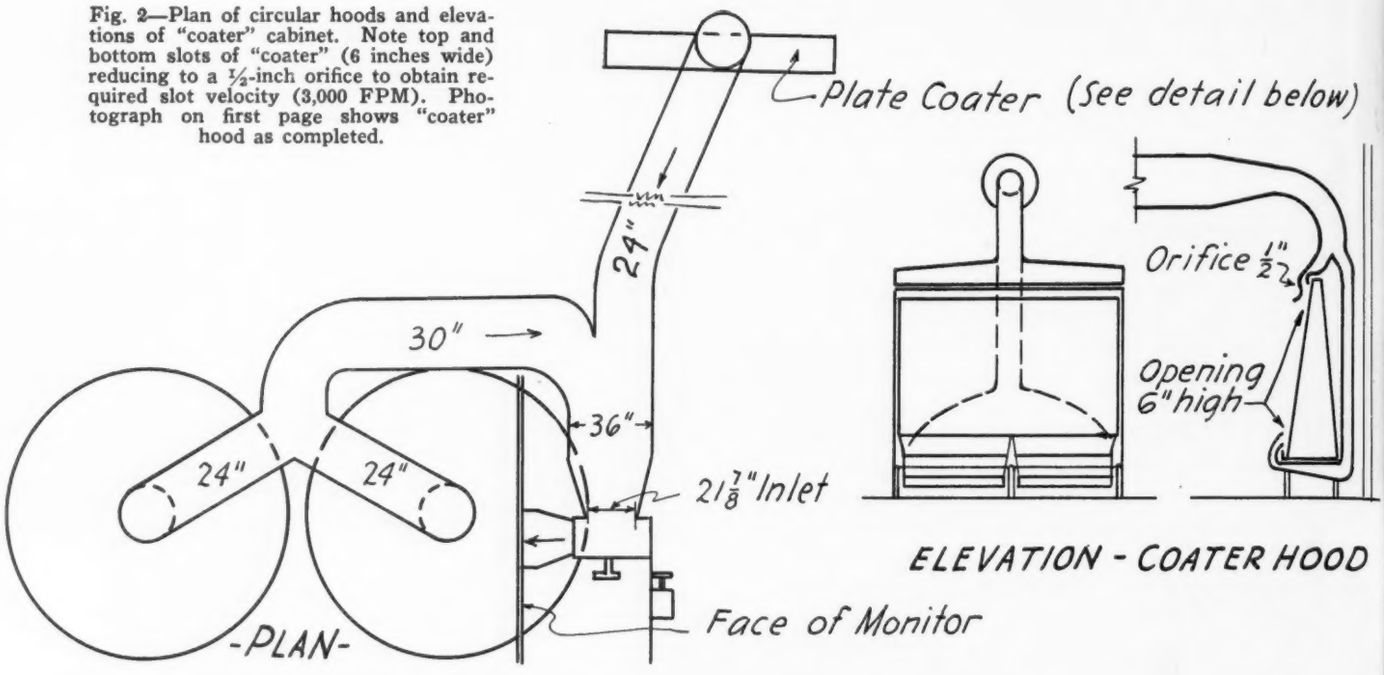


Fig. 1—Elevation of circular hoods and details of the hood and slot construction. Slot is proportioned to obtain about 2,200 FPM. Velocity through pipes about 2,200 FPM.

Fig. 2—Plan of circular hoods and elevations of "coater" cabinet. Note top and bottom slots of "coater" (6 inches wide) reducing to a ½-inch orifice to obtain required slot velocity (3,000 FPM). Photograph on first page shows "coater" hood as completed.



the cabinet and still breathe clean air. The top hood and bottom slot are constructed as shown in the elevation of the cabinet and connect, as shown in one photograph, with the same exhauster. The velocity through the slots is about 3,000 fpm. Note on the sketch the restriction of the 6-in. slot to a ½-in. orifice to better control air flow through the hoods and raise the velocity.

The system has no dampers. When the fan runs, all three hoods exhaust air. Approximately 4,500 cubic feet of air are removed by the fan and this air is replaced, as stated in the first paragraph, by air from the plant admitted through connecting doors. The fan is controlled by a manual switch.

Since the mist and fumes handled are corrosive, special attention was given to the painting of the metal work. The inside surfaces of hoods and pipes are painted. So are the outside surfaces. Inside and outside painting is identical except that the last (third) applied coat on the outside is plant paint used throughout the building. The resistant painting consists of a first coating of Cobalt paint (a special paint used by the Carrier Corp.) applied on the bare metal. Over this is a second coating of asphaltum paint. The two coats keep the fumes from the metal. The inside and outside of the fan, incidently, are similarly protected.

Measuring and Controlling Viscosity (*Continued from page 79*)

the installation of constant temperature apparatus is not always feasible, either for reasons of cost or because the use of such equipment might interfere with manufacturing procedure. Therefore, it is usually necessary that constant viscosity under variable conditions of temperature be attained through the use of solvents.

Viscosity Control by Solvents

In cold weather, larger solvent additions are necessary than in warm weather. In some cases, depending on the nature of the material and the job, a single compromise thinning ratio and viscosity might be used under all conditions of temperature, warm or cold. Although complete control by means of solvents would necessitate a different ratio for each temperature found in a finishing room, one for average warm and one for average cold temperatures are usually sufficient.

For example, a finishing room may average 85°F. through the summer months and 72°F. during the winter period. For a certain material these conditions might require four volumes of paint to one of thinner and three volumes to one, respectively to give the same viscosity. Under this system, the non-volatile solids content and the hiding power would be somewhat higher in summer than in cold weather, but average good sprayability, flow-out and build would be obtained.

The maintenance of constant viscosity means the elimination of one variable in organic finishing. Much time and money can be saved if viscosimeters are used to set up material application specifications and for periodic control checks on the material viscosity.

Prime Sheets . . .

and 10,000 Other Steels . . .

In Stock for Immediate Shipment

Buy your bands, bars, angles, etc. along with your sheet requirements. Ryerson carries large and complete stocks of every kind of steel product, so that it is easy to concentrate your purchases with this one safe source. The Ryerson Certified Steel plan assures prime sheets cut to accurate size and delivered in the best condition. A descriptive Ryerson Stock List is available—write today. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

Principal Products Include:

SHEETS

Galvanized	Copper Alloy	Hot Rolled	Enameling
Galvannealed	Panel and Sign	Deep Drawing	Allegheny Stainless, etc.

Other STEEL PRODUCTS Include:

Structurals	Hoops, Bands	Tubing
Channels	Strip Steel	Wire
Angles	Bars	Bolts, Rivets
Tees, Zees	Plates	Welding Rod, etc.

RYERSON CERTIFIED STEELS

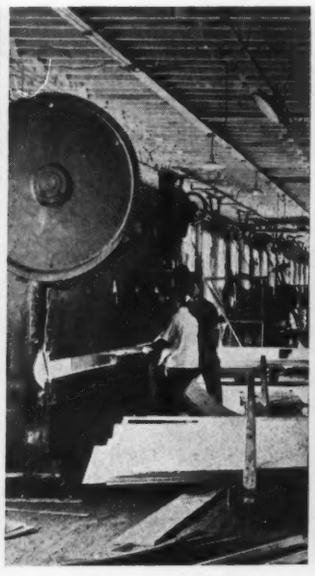
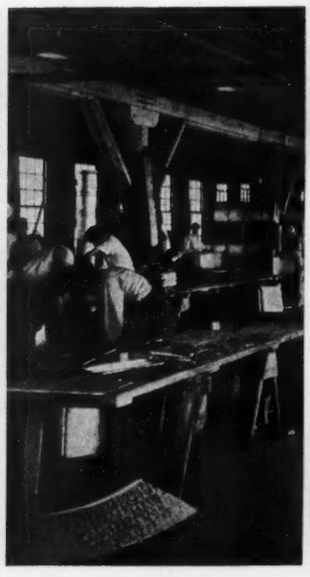
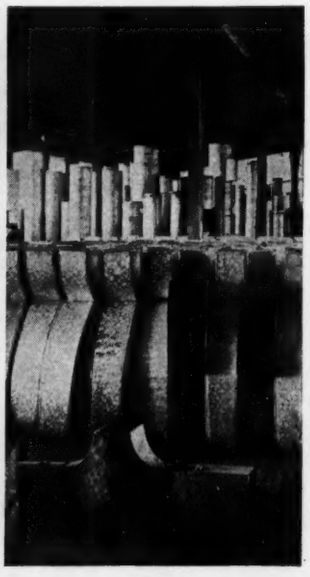
RYERSON

Again it's

Beth-Cu-Loy Galvanized Steel Sheets

...As you know, we are at the present time in the process of cutting and forming into air ducts and ventilators some 250 tons of Beth-Cu-Loy galvanized steel sheets.

We are pleased to state that these sheets are running through our plant in a very satisfactory manner. Feeling that you might be interested, we are forwarding a set of four photographs showing the process of manufacture in our plant...

In this excerpt from a customer's letter is seen one more reason why Beth-Cu-Loy Copper-Bearing Galvanized Steel Sheets are gaining so much popularity. For, in addition to giving double life to ducts through their high corrosion resistance, Beth-Cu-Loy Sheets will run through your plant too "in a very satisfactory manner." And for the extra protection of Copper-Bearing Beth-Cu-Loy, you pay only a few cents more per sheet, enabling you to give your customers added value at slight increase in cost.

BETHLEHEM STEEL COMPANY

Indiana's officers and directors for 1941. Standing (left to right) Directors Lehnen, Sieb; 2nd V. P. Watson; director Carr. Seated (left to right) Director Livezey; President Mullin; 1st V. P. Sink; Secretary Selch.

Furmet officers and directors for 1941. Standing (left to right) 3rd V. P. Rhein; 1st V. P. Nemec; director Renick; 2nd V. P. Meeks; director Shea. Seated (left to right) President Schmidt; past-President Meador; Secretary Joslin; director Kelly; director McManama.

Indiana's Convention Reflects "Good Times"

THE best attendance in several years featured Indiana's 1941 annual convention. Actively advertised by the association and promoted by salesmen of the Indiana Furmets, the convention had registered almost 100 contractors, more than 65 manufacturers' representatives and a score of guests before the second day was well under way.

Governor Henry F. Schricker welcomed the convention to Indianapolis and declared that organization is the thing which makes industry succeed, whereas disorganization is the thing which makes any industry fall apart. Every man in business, declared the governor, today should have an absorbing interest in government—local, state and national. Today, said the speaker, is a critical period in American history. We are spending millions of dollars for war and waste and how much better it would be if these vast sums were spent for better living conditions.

Charles W. Jones of the William H. Block Company, Indianapolis retail store, pushed the importance of associations along and suggested that every individual has a desire to feel important which desire can find satisfaction in association work. Mr. Jones said he had observed that many thousands of young persons now seem to wish to get a position in some white-collar activity, whereas the best opportunities today lie with the trades, and he suggested that a very excellent association activity might be the advertising of the advantages of our industry among young persons of suitable attainments. The speaker cited the fact that few individuals or firms can afford to engage in research, whereas research has been and probably always will be an important association function.

Reduce Local Taxes to Pay for Rearmament

The suggestion was offered by J. D. Wilder, American Artisan, that every man in business should pay increasing attention to matters of legislation and taxation. There has been a trend in recent years, declared the speaker, toward a more powerful federal government and this trend has meant more messing by government in the business of every business man. This increased messing in business costs money and this increased cost will be born by increased taxation.

The speaker pointed out that taxation must increase because spending is increasing. The rearmament program will cost not less than $50,000,000,000 and may approach 75 or 100 billions, depending upon whether or not America actively enters the war. And he emphasized that no man in business today wishes to see the rearmament program curtailed in any manner, but the increased cost of rearmament must be compensated by decreased cost elsewhere, so the suggestion was offered that every man in business investigate tax complaint bodies which are today being organized locally or statewide and even nationally for the purpose of suggesting to local and state legislators that certain drastic reductions in cost of operating government can be made without reducing any actual governmental function needed. The speaker cited as encouraging, government statistics indicating a 1941 national income approaching $90,000,000,000 dollars as compared with 1940's 73 billion dollars; at least 200,000 new house jobs for rearmament program civilian workers; FHA will actively promote modernization requiring thousands of furnaces; the sheet metal field should be active in ventilation and material or fume handling because of the large number of plants now being rehabilitated for rearmament contracts.

"Tools for Selling"

An interesting address on general business problems was presented by T. I. Byrd, American Rolling Mill, who discussed "Tools for Selling." The question "Can I afford to advertise?" should be rephrased

Left—Indiana's Governor Schricker said associations make industry progress and—right—Charles Jones, local merchant said our industry should advertise our trade as a good field for bright young men.

Left—T. I. Byrd (Armco) asked contractors to use the "tools for selling" offered free of cost by our industry's manufacturers.

Right — Minneapolis - Honeywell's Guimont showed and described his company's 1941 consumer advertising campaign to tell the story of automatic heat to half the nation's home owners.

to "Can I afford not to advertise?" In the final analysis, said Mr. Byrd, the man who advertises does not pay for his advertising—the consumer does. Our industries are unusually fortunate in having dozens of manufacturers willing to supply the contractor with every possible sales or advertising tool, and Mr. Byrd showed a number of samples of stuffers, shop signs, truck signs, and other tools offered by his firm and others free of cost. Among the several inexpensive advertising methods suggested by Mr. Byrd were small printed envelope stuffers to accompany letters or bills; such stuffers are offered free by many manufacturers.

Letters to prospects are like a rifle shot, said Mr. Byrd, in that the letter is from one individual to another individual. By comparison, advertising in newspapers is like a shot gun in that many shot are wasted in order to get one shot on the target. Show windows afford an excellent field for activity providing the contractor is located on a thorofare used by prospects or customers. Many firms, pointed out Mr. Byrd, spend hundreds of thousands of dollars a year buying space on trucks for advertising—the sheet metal contractor can so employ his trucks free of cost but the trucks should be clean, should be attractively painted, and signs should be large lettered so that they can be easily read. The telephone is used too little in the average furnace shop and if the contractor wants to improve his telephone sales presentation most local telphone companies have booklets which tell just how to take the utmost advantage of the telephone.

M-H's 1941 Consumer Advertising Program

A most interesting discussion of advertising automatic heating was presented by R. L. Guimont of Minneapolis-Honeywell Regulator Company, who presented Minneapolis-Honeywell's 1941 consumer advertising campaign. This campaign does not sell named control instruments—it sells automatic heat and the automatic heating merchant. To insure this tremendous campaign receiving utmost acceptance, Minneapolis-Honeywell made a survey designed to cover all principal heating markets and found that 97% of persons interviewed considered automatic heat too expensive or have no present desire for automatic heat; 10% have automatic heating more than five years old; making 60% prospects for modern equipment." Is your heating plant automatically fired?" —Yes, 46%; no 54%.

During 1941, Minneapolis-Honeywell has purchased full-page advertising space in many popular media such as Better Homes and Gardens, American Home, Saturday Evening Post, Women's magazines and other media. In addition, a large number of billboards located in all key cities will be used during the heating season and during the building season. The Home Owner's Catalog, with a circulation of some 60,000 prospective builders will also be used in the campaign. Posters and display cards suitable for showing in windows or for use inside display rooms are available and will be distributed through jobbers to dealers free of cost. Minneapolis-Honeywell believes that several millions of readers will see this message on automatic heating during the building and heating seasons.

The "Yardstick" and Gravity Heating

Discussions of heating and sheet metal work occupied an important place in the program. Prof. S. Konzo of the University of Illinois presented the "Yardstick," the booklet by the National Warm Air Heating and Air Conditioning Association prepared to explain to the consumer, the architect, the operating builder, what constitutes an "excellent," a "good," a "poor" mechanical warm air heating installation. Copies of the Yardstick were distributed and Prof. Konzo went through the Yardstick item by item, pointing out why certain items were incorporated, the meaning of other items, the importance of certain clauses in the Yardstick, and summarized the general intent of this new booklet.

Since it is impossible to present this discussion in detail, it is suggested that, instead, every contractor ask his furnace manufacturer for copies of the Yardstick. Or, if the manufacturer is not a member of the National Warm Air Heating and Air Conditioning Association, the contractor should obtain copies from the National association at 145 Public Square, Cleveland.

Gravity warm air heating formulas were discussed in detail by Fred Bishop, member of the National Code Committee. Mr. Bishop explained how the grav-

Fred Bishop, member of the N. W. A. H. & A. C. Ass'n code committee demonstrated the underlying theory behind the Standard Code. He also said—"Stop selling fire-pot diameter; that's not a complete measure of furnace capacity."

Left—E. A. Eichenberger (F. Meyer & Bro. Co.) and H. V. Dettman (Lockformer Co.) discussed merits of prefabricated and shop made ducts and fittings.

Right—E. C. Carter (Snips) illustrated his talk on shop activities with slides of proposals, show rooms, new types of buildings, better shop practices.

ity code factors were established and described the research which preceded the establishment of these factors. He explained the relationship between the gravity code pipe size factors and the straight Btu method of establishing heat loss. Mr. Bishop presented a typical problem and showed how the square inches of gravity leader pipe required were established using Gravity Code factors and how an almost identical total area of leader pipe was established by using the straight Btu method.

Mr. Bishop asked contractors to stop selling furnaces on the basis of firepot diameter, since firepot diameter is not a satisfactory criterion of furnace capacity and instead to state furnace capacities in square inches or square feet of grate area which, at Standard Code combustion rates, determines furnace capacity. The present basis of Standard Code rating is 1.75 square inches of leader pipe area for each 1 square inch of grate area, when the furnace is constructed with a 20 to 1 ratio of heating surface to grate area.

Prefabricated or Shop-Made Ducts

E. A. Eichenberger of F. Meyer & Bro. Co. said the first "prefabricated" duct system was introduced in 1890 but did not receive good acceptance and languished until a few years ago when, with the advent of forced warm air heating and automatic firing, the idea of prefabricated ducts gained a favorable recognition.

The chief advantage of prefabricated duct, declared Mr. Eichenberger, is that by using prefabricated ducts, more time is available for selling and managing the business. Prefabricated duct manufacturers have spent much time and money in designing new sections and fittings in order that the contractor now has almost any fitting needed for practically any warm air heating system. Flexibility is the keynote of today's prefabricated items. Waste of labor and material is almost eliminated and profit can be increased because a very definite material cost is established immediately.

Mr. Eichenberger demonstrated the flexibility of prefabricated ducts by showing a typical house plan requiring almost every conceivable fitting, all of which could be selected from practically any prefabricated duct manufacturers catalog.

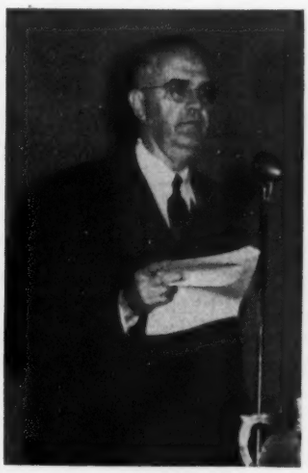
H. V. Dettman of the Lockformer Company suggested that contractors favoring shop made duct sections and fittings can reduce material and labor costs considerably by standardizing on duct width and depth and by running through the shop as large a number of sections at one time as space for storage permits. Some contractors, said Mr. Dettman, make up and assemble complete duct sections and fittings; whereas others prefer to cut and form, lock and leave the sections and fittings in the flat for assembly when the job is ready. By using modern machinery such as the Pittsburgh lock forming machine, time in fabricating sections and fittings is reduced radically. The speaker cited several contractors who employ spot welding machines to complete sections and fittings in place of machine or hand seaming, wherever such fittings are permissible under local ordinances.

"What Other Shops Are Doing"

Along this same line of more efficient shop operations, E. C. Carter of Snips Magazine, presented an illustrated lecture on "What Other Shops Are Doing." Among the possibilities suggested by Mr. Carter was the use of a standard, simple contract form for even the smallest job, which when filled out and signed by the contractor and the customer specifies exactly what is proposed, how much it will cost and becomes a signed order and agreement.

The rearmament program is affording many contractors, said the speaker, opportunities to sell metal roofing and metal siding on temporary type buildings,

(*Continued on page* 130)



Left — The team of Joslin and Jordan gave the convention many new ideas on ventilation as a field for profits.

Right — Ralph Poe demonstrated his "Roll-out" method of pattern development to an interested audience and held this impromptu "curtain call" after the session.

AFTER MODERNIZATION

STATEMENT B—Composite profit and loss statement for the same 24 *eastern warm air dealers, showing average sales, cost of sales, operating expenses and net profit from June* 1939 *to June* 1940 *after showroom modernization.*

		%		%
Sales of warm air heating installations, air conditioning units, accessories and allied lines			$63,818.15	100.0
Cost of sales, including materials and labor			39,375.80	61.7
Gross margin on sales			$24,442.35	38.3
Overhead expenses		%		
Owners' salaries	$5,488.36	8.6		
Employes' salaries, including remuneration to salesmen	6,190.36	9.7		
Advertising	1,212.54	1.9		
Heat, light, power and water	382.91	0.6		
Bad debts	319.09	0.5		
Other expenses, including rent, interest paid, shop expense, free service, taxes, insurance, truck expense, depreciation on furniture, buildings, equipment and trucks, office expense, incoming freight, express and cartage, miscellaneous	6,318.00	9.9		
Total overhead expenses	$19,911.26	31.2	$19,911.26	31.2
Net profit on sales			$ 4,531.09	7.1

Profits Rise—When You Modernize

By Arthur Roberts

WHEN a warm air dealer is approached to invest in merchandising modernization, whether a new store front, remodeled interior or streamlined lighting, the first question that arises is, "Will the investment pay me?"

Insofar as we know, this query has never been answered definitely; but only with general explanations anent the profitable advantages of any form of modernization touching the sale of warm air furnaces, air conditioning units and allied lines. Generalities, however, seldom convince, hence, many warm air dealers who would benefit by turning their shops into showrooms instead of keeping them cluttered up with tools and other mechanical devices for sheet metal work, do not invest in this form of business betterment. Considerable research on our part disclosed limited data on the subject of showroom modernization in the warm air heating field, so to correct this deficiency a field study was undertaken in the east to get definite data on the results of showroom modernization in the warm air and sheet metal contracting field. The records of 24 eastern warm air heating dealers who had modernized their showrooms in one way or another from June, 1939, to June, 1940, were analyzed, comparing their profit and loss statements in composite for this period with the preceding 12 months from June, 1938 to June, 1939 when the same dealers were still operating with gay-ninety store fronts, without window showmanship and with interiors that looked more like repair shops than merchandising establishments.

The condensed, comparative profit and loss statements shown with this article visualize the profit-building power in showroom modernization. The type of remodeling work done was not considered, the only objective of this research was to show the profit-building potentialities in any form of modernization that the warm air heating

BEFORE MODERNIZATION

STATEMENT A—Composite profit and loss statement for 24 eastern warm air dealers, showing average sales, cost of sales, operating expenses and net profit from June 1938 to June 1939 before showroom modernization.

Sales of warm air heating installations, air conditioning units, accessories and allied lines			$51,632.81	% 100.0
Cost of sales, including materials and labor			33,509.69	64.9
Gross margin on sales			$18,123.12	35.1
Overhead expenses		%		
Owners' salaries	$5,060.02	9.8		
Employes' salaries, including remuneration to salesmen	5,524.71	10.7		
Advertising	309.80	0.6		
Heat, light, power, water	413.06	0.8		
Bad debts	464.70	0.9		
Other expenses, including rent, interest paid, shop expense, free service, taxes, insurance, truck expense, depreciation on furniture, buildings, equipment and trucks, office expense, incoming freight, express and cartage, miscellaneous	5,008.38	9.7		
Total overhead expenses	$16,780.67	32.5	$16,780.67	32.5
Net profit on sales			$ 1,342.45	2.6

dealer may effect in his showroom. Since the figures were gathered with only this one objective in mind, they cannot be used as yardsticks for general operating averages.

Notice that margin on sales increased 3.2 per cent after modernization. Unless there is ample margin to take care of overhead expense and a reasonable net profit, the warm air heating dealer is behind the 8-ball. After deducting a salary for his services, the dealer deserves at least 6 per cent net profit on sales and he should maintain prices and a merchandising set-up that will assure this return.

The lower average margin on Statement A was due largely to price-cutting, which is a big detriment in this industry. This survey indicates that price-cutting can be minimized with modernization. Customers prefer to buy in modern showrooms, whether the dealer sells warm air furnaces or groceries, they will pay a premium for the privilege and that preference means bigger profits for the dealer who capitalizes showmanship.

Dealers serving as "guinea pigs" for this field study reported that their salesmen found it easier to close sales at profitable prices after modernization. The showrooms of so many warm air dealers are so unappealing that salesmen who bring customers there to view demonstrations, have difficulty making an impression. Before modernization, only 5 dealers employed outside salesmen, after modernization, 18 dealers had business digger-uppers on the payroll. Unattractive showrooms do not team well with outside sales work, consequently, results are below par, the salesmen quit or are laid off. Modernization and outside sales work make an excellent team to pull in bigger profits.

Statement B shows that overhead expenses, after modernization, decreased 1.3 per cent, on the average, despite the fact that sales averaged an increase of 23.6 per cent. This indicates that the dealers reviewed were not making capacity sales before modernization, a condition existing with many dealers who are paying expenses that could carry bigger sales volume, but are not getting it because their store fronts say, "Go by," instead of "Come buy," and their store interiors are so gay-ninety that they belie the ability of the owners to do a satisfactory heating job.

The overhead-to-sales ratio usually decreases

when a dealer increases volume, sometimes 50 percent more business can be handled with the same percentage of overhead because fixed charges, such as rent, taxes, insurance and depreciation do not increase with sales and often variable expenses, such as light, heat and telephone charges, increase but slightly and such increases may be offset by savings elsewhere. Unproductive labor, which was included in overhead, was high before modernization. Too much idling in the shops because sales did not step along fast enough. After modernization, jobs followed jobs more regularly with a smaller loss resulting from unproductive labor.

Employes' salaries, including salesman remuneration, decreased 1 per cent after modernization. Often salesmen are blamed for not closing sales in a showroom when the poor appearance of the establishment is to blame. Eye appeal means buy appeal whether selling warm air furnaces or cosmetics.

Those dealers hobbling along with gay ninety trappings because they assume showmanship has no place in the merchandising of warm air furnaces and air conditioning units, are making a big mistake, in the opinion of dealers interviewed for this field study, who stated that "walk-ins" increased approximately 30 per cent after modernization. One dealer who installed an outdoor sign and new store front reported that "walk-ins" after dark increased more than 60 per cent. He keeps open at night and stated that his records revealed an increase of 150 per cent in night sales made to "walk-ins" and prospects brought in by salesmen.

Advertising expense more than tripled after modernization and this included newspaper advertising, direct-mail, window showmanship. Before modernization, advertising expense at 0.6 per cent of sales was too low. Many dealers are too frugal with advertising but regardless of their outlays, they cannot expect maximum results unless their showrooms are modern.

All dealers promoted their lines more aggressively after modernization so that the results really mirrored the combined efforts of remodeling and better merchandising. The urge to capitalize modernization after completion is akin to the desire of the individual to exhibit his modernized basement to friends after installing a new warm air furnace with automatic heat and air conditioning. Modernization is a stimulus for better merchandising all around. The dealer, feeling more confident in his ability to sell first-quality merchandise at profitable prices after modernization, promotes sales more aggressively because he realizes he has found "what it takes" to get maximum results with his efforts. The fact that net profits more than tripled after modernization indicates that a showroom facial is a direct answer to how to fatten the bankroll.

Sixteen dealers streamlined their lighting, getting better light at lower cost, up to 25 per cent saving. Inadequate illumination is high in operating cost because more wattage must be burned to get "seeability". Poor illumination produces shadows, glare spots, uneven distribution, which are detrimental to sales. Modern lighting builds business. In show windows, it doubled attention-attraction, say the dealers who remodeled. Light is a selling tool. Hit-or-miss lighting is hard on the eyes and hard on sales. Fluorescent lighting, now so popular, should be considered.

Eighteen dealers re-floored. The floors in many stores are eye sores, a bad advertisement for the wares. If your floors are "down at the heel", the effect is negative regardless of how attractive the rest of the room. All showrooms were re-decorated in one way or another. The market offers many wall, ceiling and floor finishes, from fibre board paneling to knotty pine siding, easily and economically installed.

None of the dealers increased his selling area after modernization, but all got more business from the same territory. Most dealers do not cultivate local sales territory thoroughly enough. More intensive cultivation would yield more business.

Before modernization, 9 dealers were in the red, after modernization, all were in the black. One dealer transformed a 2.3 per cent loss to a 9.1 per cent gain, or a betterment of 11.4 per cent due to modernization. The average investment in modernization was $1,680.05, the average increase in net profit $3,188.64, which indicates that modernization in this field pays for itself twofold the first year. One dealer queried with, "How much did your new store front cost you?", replied, "Nothing. I paid as I made," explaining that he had bought on installments, about 20 per cent down and liquidated the expenditure out of the increased profits from month to month.

The dealers furnishing these figures operated in different size towns at different locations, were faced with different problems and featured different lines, yet, as a group, they each averaged a substantial increase in net profits and sales after modernization. The figures shown on the accompanying statements show definitely that profits rise when you modernize, that modernization is within the means of all, that business will never be tops with sub-standard showmanship. Too many warm air heating dealers and sheet metal contractors with well equipped shops, utilize showrooms with little or no "buy appeal." Salesmanship and display are as essential as good working tools.

Seated (left to right)—Director Louis Stefanik, Milwaukee; President T. P. Brenner, Fond du Lac; Secretary Paul Biersach, Milwaukee. Standing (left to right)—V. P. Paul Krueger, Madison; V. P. Martin Schaar, Milwaukee; V. P. A. Mantei, Milwaukee.

OFFICERS FOR 1941

President—T. P. Brenner, Fond du Lac
First V. P.—A. Mantei, Milwaukee
Second V. P.—Martin Schaar, Milwaukee
Third V. P.—Paul Krueger, Madison
Fourth V. P.—M. L. Van Lannen, Green Bay
Fifth V. P.—Edward Schields, Wausau
Secretary—Paul Biersach, Milwaukee
Treasurer—Walter Marth, Milwaukee

Wisconsin's Record-Breaking Convention

A PROGRAM packed with practical ideas covering a wide range of technical and business problems presented by well-qualified speakers, featured the 1941 convention of the Sheet Metal Contractors Association of Wisconsin.

Time and Material Costing Schedule

Probably the most important single piece of business transacted centered around the decision of the association to sponsor and finance the preparation and printing of a booklet which will show hours of labor required and quantities of material needed to fabricate and install warm air heating systems. The booklet will be, in effect, a price schedule for all ordinary shop and field operations involved in fabricating and installing a warm air heating system in a residence. This project has been under way by the Milwaukee local association for several years, under the direction of a committee of which member Al Walters has been chairman.

From many sources, information on time and material required has been gathered and checked among members and this information will now be compiled and printed in booklet form. The committee hopes to project this work to cover time and material required for ventilation, air conditioning duct work, fume and material handling and perhaps some phases of architectural sheet metal work. However, the initial funds voted and the first booklet to appear will be restricted to warm air heating only.

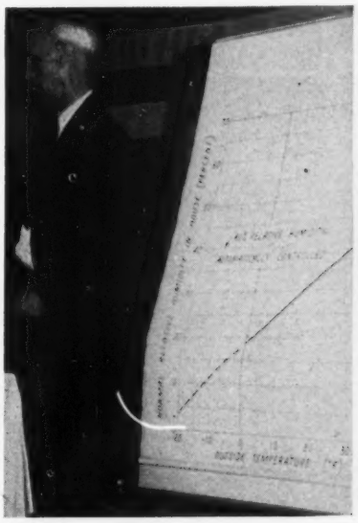
The convention sessions were launched by two inspirational speakers. Milwaukee's new mayor, Carl F. Zeidler declared that in his opinion the sheet metal and warm air heating industry represents a very important factor in the building picture. As a part of the construction industry warm air heating and sheet metal work have contributed their part toward the tremendous development of America. While other countries, said Mayor Zeidler, are tearing down the evidences of civilization, America is and should go ahead with the furthering of our economy which is represented in no small measure by the physical construction which is so typical of America and which is found in no other country.

Dr. Charles Copeland Smith of the National Association of Manufacturers, speaking on "What Makes America Tick," said that America, in the final analysis, is an economy of small business men who, in the United States only, is offered every opportunity to engage in new enterprises, to build his business as he sees fit, to the utmost possibility of his ability.

Dr. Smith emphasized this small business man's economy by pointing out that if 150 artisans go to work in any given locality, we have the nucleus for a community of 1,000 persons, 300 homes, a 30-room school, 24 professional men, and forms the foundation for a tax basis of two and one half million dollars annually.

"Big Business" Is Many Small Businesses

Dr. Smith declared that there seems to be today some evidence of a trend to harass big business, but big business is a common misconception because out



Left—Lawrence Teesdale analyzed condensation of moisture in walls and discussed remedies. Right—G. G. Jones explained how overhead is calculated and two ways of applying an overhead percentage.

of the 210,000 factories in America, more than 7,000 factories have no employees; 96,000 have from 1 to 5 employees; 53,000 have from 6 to 20 employees; 25,000 have 21 to 50 employees—or approximately 180,000 factories employ under 50 employees. This, declared the speaker, is evidence of the fact that America is really an economy of small business men.

The most amazing feature of present day American life, declared Dr. Smith, is our casual acceptance of "accessories" to living which are only pipe dreams to people in other countries. Dr. Smith cited our 30,000,000 of automobiles, our heating systems, refrigerators, radios and a thousand and one gadgets which we casually accept while even the well-to-do in other countries do not enjoy these luxuries. Our problem, said Dr. Smith, is to make sure that this familiarity with luxury does not make these accessories valueless and does not blind us to the tremendous advantages each American citizen enjoys.

Wisconsin's Progressive Compensation Law

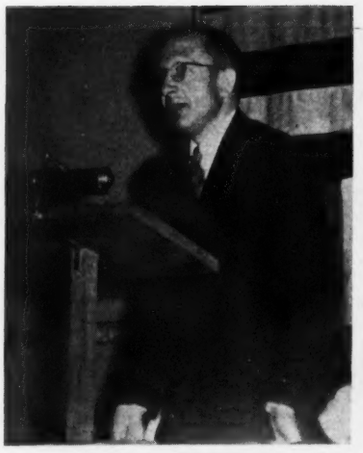
Mr. Harry A. Nelson, Director of Workmens Compensation, Industrial Commission of Wisconsin, pointed out that one problem which confronts every man in business is the matter of numerous laws passed at every session of every state legislature and then left to "paddle their own canoe" with little or no attention from the persons affected by these laws or by the legislators who passed them. Mr. Nelson declared that the average business man can not do much about many of these laws, but he certainly can do something about accidents and the laws pertaining thereto. Mr. Nelson said we can take care of industrial accidents either by charity or we can put accidents on a business basis. Wisconsin has proceeded on the latter plan and passed the first compensation law in 1911. Prior to 1911 there had been the usual employer negligence and the employee had to take his chances with local courts. Today, in Wisconsin, employer and employe are jointly liable for accidents; there is no need for juries or judges; the employe need not pay exorbitant legal fees; and the whole matter of accidents has been placed upon an established financial basis.

Sell With Proper Selling Tools

M. L. Lavorgna of the L. J. Mueller Furnace Company, speaking on "New Horizons" declared that if everyone in the industry was busy in 1940 when the government actually spent some two and one-half billions of dollars, the industry should certainly look forward to a busy and profitable 1941 when almost seven billion dollars will be spent. The industry, declared the speaker, should look forward to a very active year, and each contractor should do whatever is needed to insure the success of his sales program. Since the salesman is made and not born, declared Mr. Lavorgna, it is possible for each man, no matter what his education or training to make himself a competent salesman. What is needed mostly is fullest use of all proper selling tools. Advertising alone can not do a complete selling job; a mind full of facts and figures can not do a selling job unless these facts and figures are intelligently and properly used; knowledge and honesty are essential—knowledge is needed to do proper work; but when knowledge and honesty and sales training are combined, success is assured.

M. L. Lavorgna said selling is made, not inborn, and can be made effective if a man will only use all the selling ideas now available.

Mr. Lavorgna also explained briefly the "Yardstick" recently published by the National Warm Air Heating & Air Conditioning Association. The speaker pointed out the important features of the booklet and explained how the booklet can best be used by the contractor to make sure that the customer understands precisely what is proposed, what features are essential or important, how to differentiate between an excellent, a good and a poor design and installation, and the things the customer should look for and expect in a completely satisfactory heating installation.



Left—M. H. Kliefoth proved that filtering air is a serious problem because housewives judge the satisfaction of a modern system largely on how much it reduces cleaning. Right—Harry A. Nelson declared that workman's compensation in Wisconsin is now on a strict business basis with employer and employee freed from costly and uncertain court procedure.

Air Filtration

M. H. Kliefoth of Research Products Corporation, Madison, discussed the problems of air filtration and the equipment now available to do proper filtering. The immensity of the filtering problem was graphically portrayed by Mr. Kliefoth in some figures showing the millions of tons of dirt floating annually about the average large American city. The composition of this dirt, dust, lint, bacteria—varying in weight of particle, size of particle, and other physical characteristics, complicates the general problem of filtering. As filtering is ordinarily practiced today, one filter must be depended upon to remove all of these materials of widely varying characteristics when installed in the average residential or industrial air conditioning system.

Some particles are so small that we can not see them

All allotted space and overflow was sold to manufacturers who displayed most all things used by the industry.

under the microscope; fume particles are oftentimes ten times smaller; fuel particles are oftentimes only one-tenth the size of dust particles; and the problem is further aggravated by the presence of soot, carbon, pollens which cause hayfever and asthma and dust so fine that it is known to remain suspended in the atmosphere for years.

This problem of dust and particle removal has been attacked from many angles and today almost any condition has special apparatus available for combating dust presence. Many of these pieces of apparatus are expensive or complicated or difficult to install, so the air filter, either the permanent or replacement type, is generally depended upon for the large majority of installations. The features which make a filter satisfactory are low resistance, high capacity and high filtering efficiency. Properly selected, properly sized, properly installed, these low-cost filters will do an excellent job of alleviating dust trouble.

Condensation in Walls

Mr. Lawrence Teesdale of the Forest Products Laboratory, Madison, presented an interesting discussion of condensation in humidified buildings. The discussion followed closely the articles by Mr. Teesdale previously published in AMERICAN ARTISAN but in brief the discussion centered around the causes of condensation, and the effect, and the remedies. Mr. Teesdale declared that condensation first became a topic of discussion in 1936 which was an exceptionally cold winter, and gained recognition as hundreds of complaints of leaking roofs. This was followed by complaints of paint failures and toward the end of the winter by reports of saturated insulation in walls and attic floors.

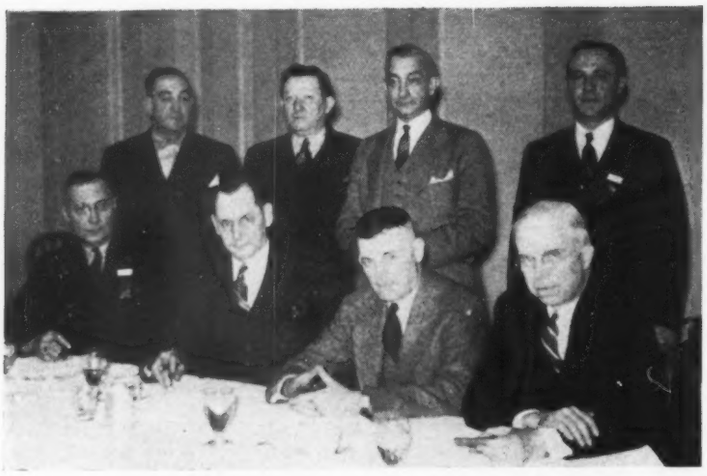
This problem of condensation is brought about by our generally tighter building construction today. Whereas in older buildings inside heated and humidified air had little difficulty in escaping from the building, today with weatherstrips, storm sash, wall and ceiling installation, and generally tighter house construction, the warmed and humidified air has greater difficulty in escaping. Today, we are attempting to carry higher inside relative humidity and since relative humidity is only the presence of moisture which is under pressure and which tends to escape from the areas of high vapor pressure to areas of low vapor pressure, this humidified air and the vapor must pass out of the building.

Mr. Teesdale pointed out that the remedy easiest to apply is the incorporation in the inside wall (as near the inside room air as possible) of a vapor barrier through which vapors can not pass. If we keep vapor out of the wall, we will have no problem of condensation within the wall. The early complaints of leaky roofs came about because the moisture condensing on cold metal surfaces or roofing nails, melted when the sun struck the roof and dropped to the floor below. Paint troubles arose from the fact that the vapor escaping through the outside framing and wood took the paint with it. A vapor seal can be obtained in old houses by the use of a metallic paint on the inside surface and in most new houses and old houses the attic should be vented so that humidified air in the attic can escape. Lead and oil paint, aluminum paint, or any other metallic body paint is suitable as a vapor seal. Mr. Teasdale summarized his discussion by pointing out that we can not go backward and reduce relative humidity carried indoors; neither can we eliminate insulation which is a very important comfort accessory; we can not greatly change average building construction today; but with the intelligent application of vapor seal materials, we can eliminate condensation as a problem at its source.

Lively Overhead Discussion

G. G. Jones of the Mohr, Jones Hardware Company, Racine, presented a discussion on overhead and

(*Continued on page* 126)



Ohio Stages A Lively Convention

Officers and Directors for 1941. Seated (left to right): Secretary Gundlach; President Feiten; Director Bogen; Treasurer Mannen. Standing (left to right): Directors Orton, Lenz, Lauer, Christen.

FOR 27 continuous years there has been an Ohio Sheet Metal Contractors Association annual meeting. The 27th, held this year in Columbus, was, in the opinion of long time members, one of the best attended, most interesting, and enthusiastic meetings in many years.

A. P. Lamneck Surveys Government

The convention got away to an enthusiastic start on the first afternoon when a joint meeting between contractors and salesmen, listened to Arthur P. Lamneck, formerly Congressman from the Columbus, Ohio, district, and before that a well-known pipe and fittings manufacturer in our industry, discuss some of the conditions which demand instant attention by every man in business. Mr. Lamneck declared that business men today are operating in a very difficult era, but that the conditions confronting industry are quite likely to be even more difficult one or two years hence. "Our forefathers fought the revolutionary war to insure life, liberty and the pursuit of happiness," declared Mr. Lamneck, "but we today seem to have forgotten what liberty means and we are taking, as business men, lying down, a trend toward a strong Federal government, which in the end can only mean the loss of individual liberty as business men."

Mr. Lamneck pointed out that under the constitution, most of the powers regulatory to business and private life were purposely placed in the hands of the state, but today this state independence is slowly being taken away by the Federal government. "There is too much government today by pressure groups," declared Mr. Lamneck, "and this eventually leads to the necessity for every industry to be represented in Washington by a pressure organization. This is not the type of government which the forefathers of the country intended."

Indicating this trend toward loss of individual and state rights, Mr. Lamneck pointed out that the wages and hours bill disregards the constitutional right of every man in business as an employer to a jury trial. Under the wages and hours act, the business man must accept ruling of a quasi-official committee. The agricultural processing tax under which millions of dollars are taken away from rich states and handed out to the poor states is another indication of the loss of states rights.

"Today we have practical control of the radio, and it is perfectly possible for this control to be extended to the press and even religious freedom."

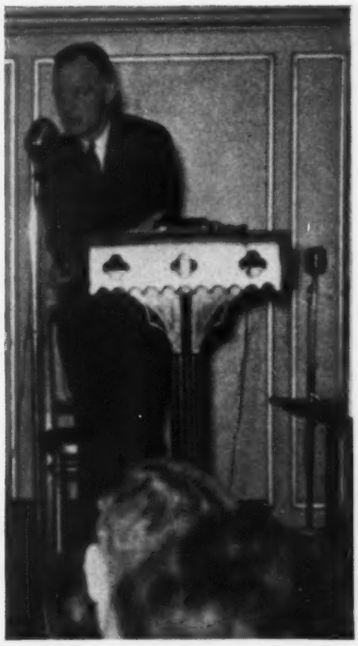
The convention was officially opened by an address of welcome by Floyd F. Green, mayor of Columbus, who said that he had attended many conventions but he did feel that 27 years of association activity was indicative of the fact that the Ohio Sheet Metal Contractors Association must be giving members something well worth while. One of the biggest problems confronting the municipality today is safety, said Mayor Green, and he pointed out that Columbus and other cities are doing everything possible to reduce the traffic accidents. This protection of life and property should be extended to the activities of every man in business so that industrial accidents can be greatly reduced.

Compensation Rates Can Be Reduced

Harry L. Sain, of the State Industrial Commission, speaking on compensation insurance and compensation rates, delivered an excellent talk replete with many stories, thumbnail illustrations of important points in industrial relations, impossible to report, but

James Thomas, D.D. (ex-wrestler, ex-prize fighter) said in a stimulating talk—"Guidance for young people we must have—the man in the wrong job is to be pitied." Right—Banquet Toastmaster Arthur Lamneck (left) and speaker Sauer (a small town newspaper editor) but a "big town" speaker "took the Battle of Bunker Hill all apart" in between homely anecdotes.

Left — Genial Mayor Green welcomes the "boys to Columbus" and talked safety. Harry L. Sain was supposed to talk on reducing compensation rates but really philosophized on things in general in a zip-zip talk which kept the audience on seat edges for an hour.



Right — D. Johns introduced an International Nickel Co. movie showing Monel in use during the last 30 years.

so interesting and alive that the members were on the alert for a full hour. The point Mr. Sain chose to emphasize was illustrated, he said, by one of the rules of business of Charles F. Kettering, who used to say "Keep the window of your mind open at least six inches from the top" and Mr. Sain asked members to apply this simple rule to all their daily activities, to the end that the mind would never be closed to new conditions or new ideas.

Spirit, said Mr. Sain, is the thing which makes any business go and no organization can be any greater or any better than its manifested spirit. Knowledge means nothing, said Mr. Sain, in itself; it is results obtained through knowledge which really count. Wisdom gained by hard experience and practical work is oftentimes more valuable than knowledge gleaned from text books.

Mr. Sain pointed out that Ohio Sheet Metal & Roofing Contractors are paying from $2 to $7 per $100 of payroll for accident insurance as compared to many Ohio industries paying as low as 80 cents (this applies to the steel industry in Ohio) and the speaker asked why these high rates should prevail. He answered his own question by stating that "the Ohio Industrial Commission does not set rates; rates are set by each industry individually according to the type and number of accidents which that industry shows in a given year. The only way in which the sheet metal and roofing industry can reduce its accident insurance rate is to reduce the number of fatalities and serious injury. This is a problem of every man in business. Mr. Sain pointed out that the Ohio industrial commission will gladly conduct free of cost an accident prevention campaign with any association or the association members or even with an individual contractor and his employees.

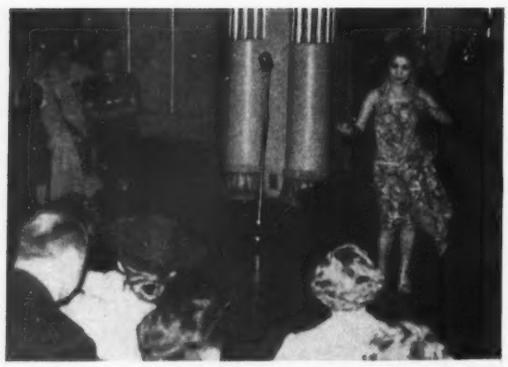
Pity the Man in a Misfit Job

In order to keep the convention together for the first day, a luncheon was tendered to members at which the Rev. James Thomas, Columbus Methodist minister, and in times past an iron worker, a blacksmith, a prize fighter and wrestler, delivered a most inspirational talk, the crux of which was that the great problems confronting America today are social problems and these social problems can not be solved by legislation alone or by wishful thinking alone and will not be solved until the young people of the nation find themselves. In order that young people may find themselves, the older generation must extend to the young people a helping hand of experience. The most important question which any man can ask himself, said Mr. Thomas, is "Are you in the right job." Helping young people to find their proper niche in life is the crux of our present social unrest. If we are happy in our work, if we are doing the job we are best fitted and like most to do, then we will get the utmost out of life, said Mr. Thomas. If we are not in the right job, and are not happy in our work then no amount of legislation and no amount of imposed social change can benefit us.

The Steel Industry in a Tough Spot

Bennett Chapple, Jr., speaking on the fabrication of sheet metal, entitled his talk "Two Million People Never Saw an Elephant," and explained this by saying that each year two million new persons attain the age where they become buyers; two million persons are born; two million persons assume the teen age; two million persons go to college. Every industry should remember that if industry overlooks for one or two years this important two million bracket, that industry will very shortly find itself completely unknown to the new buying generation.

Left—Dr. Gonser of Battelle Institute forecast tremendous changes in materials we use. Center—George Boeddener introduced the "Yardstick" and pointed out how the booklet can be used to raise industry standards of design and installation. Right — Bennett Chapple, Jr., reviewed the history of steel sheet making and said "Steel is not forgetting such stable customers as sheet metal contractors who will be using sheets long after rearmament is forgotten."



It was a lively convention. A Hula dancer (she could speak Hawaiian) demonstrated the nicer movements. Hippity-hop girls (upper right) tapped. Acrobats (a correspondence course lesson in hand stands) proved that acrobatics cannot be learned in six easy lessons. And the "Can-Can's"—of course—while the audience forgot its nonchalance.

The steel industry, said Mr. Chapple, is today in a "tight box"; the steel industry is up to peak production; but tomorrow all this may change and old markets may again become the most important markets of the steel industry. Whereas the big problem of the steel industry before 1900 was the problem of production to meet demands; today the problem is to find users for the production facilities available. 25 years ago, four major customers—oil, structural, automobile and railroad—used 85 per cent of all steel production; today these four users take only 50 per cent of steel production, while the other 50 per cent is consumed by dozens of industries unknown 25 years ago. Mr. Chapple pointed out that the steel fabricated house under the present rearmament program seems likely to become a very important factor in house construction and said he believed that if the steel prefabricated house once becomes established, it will continue to be an important factor and in sheet metal activity.

The Warm Air Heating "Yardstick"

George Boeddener, managing director of the National Warm Air Heating and Air Conditioning Association introduced the association's "Yardstick" to members and went through the "Yardstick" briefly explaining the purpose of the Yardstick, and the importance of the various chapters and sections into which the Yardstick is divided. Mr. Boeddener said that it is the hope of the association that contractors will take the Yardstick and attach it to each proposal, thus providing the home owner with a method for judging what constitutes a good, a poor or an excellent installation and for judging the value of the installation proposed by a competing contractor. Mr. Boeddener also asked members to use the Yardstick by distributing it to architects, operative builders, or to anyone who can make use of such a measure of an installation.

Mr. Boeddener said the large volume of work enjoyed by the warm air furnace industry in 1940—due partly to rearmament but also to a large volume of house building—was causing the radiator heating industry to go to great lengths to depreciate the inherent value of warm air heating. Our industry will not engage in any name calling said Mr. Boeddener, but each contractor can do his bit by continuing to sell to the utmost of his ability the value and satisfaction obtained only in warm air heating.

Trends in Sheet Materials

Dr. Bruce W. Gonser of Battelle Memorial Institute, speaking on "New Developments in Sheet Metal" pointed out that many of the developments which are interesting today have not advanced to the stage of practical use, but that each one of these developments portend important changes of a practical nature in the future. Volume production of cold rolled sheets should reduce costs and widen the market and one important change in this field is the increasing thinness of sheets now being rolled. While these very thin sheets (.006 in.) may not be of practical value to the sheet metal industry, said Dr. Gonser, they do make available many new uses for thin sheets. The continuous casting of non-ferrous metals from the melting furnace directly to the rolls where the material is

(*Continued on page* 124)

New Products

For your convenience a number has been assigned each item. Circle the items in which you are interested on the coupon on page 116 and mail to us.

● Indicates product not listed in 1941 Directory.
△ Indicates manufacturer not listed in 1941 Directory.

27—June-Aire Gravity

American Foundry & Furnace Co., Bloomington, Illinois, offers the June-Aire vertical model, gas fired, gravity unit.

The casing is finished in Hammerloid Blue—a baked-on enamel finish with chromium fittings. Casing is low to give ample pitch for warm air pipes. Heating unit is of cast iron, with vertical fins, exterior and interior.

The humidifying pan has been designed with fins on the back, which extend into the combustion chamber. Automatic float tank keeps the pan filled.

Either a solenoid or diaphragm type of gas valve with a safety pilot and pressure regulator are furnished. A limit control is provided.

Cast iron baffles have been inserted in the combustion chamber. The gas burner is of the atmospheric type with raised, drilled parts.

The capacity of the single section (JVG-65) is 43,800 Btu at the register, while the two section (JVG-130) is 87,600 Btu at the register.

Built-in bottom has a raised lip which extends around the entire unit to make the unit dust tight.

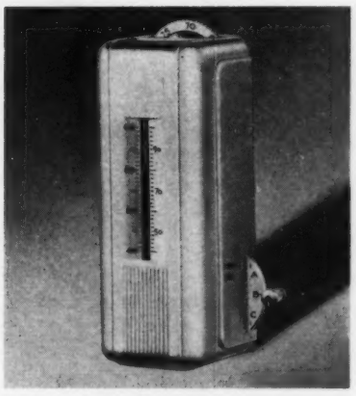
◆

28—Blower-Filters

Conco Corporation, Mendota, Illinois, announces a series of new blower-filter units with a "hammer-finish" baked enamel cabinet 31x24½ and 24⅝-in. deep, fabricated of heavy body stock. A 2-inch thick filter provides 500 square inches of filter.

29—Magic Dial Thermostat

Perfex Corporation, 415 West Oklahoma Place, Milwaukee, announces a heater type thermostat with a sensitive and powerful bimetal element. It incorporates two specific improvements. First, the heater element is attached directly to the bimetal element so that the coil supplies heat to the bimetal by conduction, giving quicker response and regular recycling. Second, the recycling characteristics can be adjusted by an external lever so as to "tune" the thermostat to the heating system, unit or fuel.



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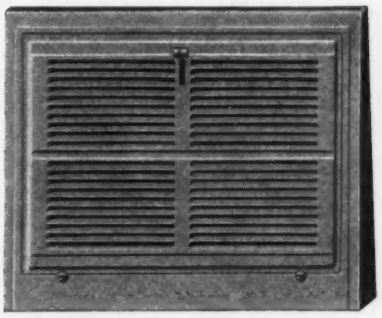
30—Gravity Register

The Auer Register Company, 3608 Payne Avenue, Cleveland, offers a new gravity register—the Heat-Rite—in a full range of sizes for baseboard or wall, and intakes for baseboard.



The register is of the fin type, in one and two-piece models, with slightly downward directional fins. Open area is carefully calculated and abundant. The Heat-Rite is intended for remodeling or new installations.

Auer also offers their new Dura-Tone, a metallic lustre finish.

●31—Koroplate

The B. F. Goodrich Company, Akron, Ohio, announces a new grade of Koroseal paint, named "Koroplate" and developed to protect metal surfaces against chemical reactions.

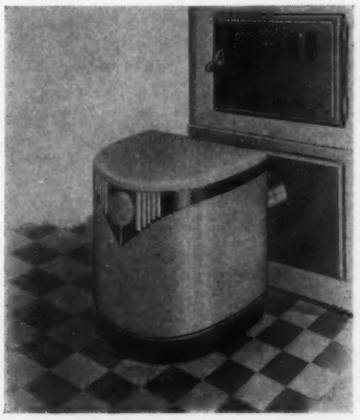
Base of the paint is Koroseal, a synthetic material created in the Goodrich laboratories from polyvinyl chloride, which is derived by a series of chemical reactions from coke, limestone and salt.

Koroplate is liquid at room temperatures. At ordinary temperatures it can be either brushed or sprayed, and can be thinned with either brush or spray thinners when necessary. It is made only in semi-glossy black. It must be used in conjunction with a Koroseal primer.

◆

32—Acousti-Case

Williams Oil-O-Matic Heating Corporation, 1201 E. Bell, Bloomington, Illinois, feature an Acousti-case for their K series Oil-O-Matic low pressure oil burners for 1941. Utility and beauty are combined in this case which protects the burner mechanism against dust and dirt, streamlines its appearance and achieves quietness.



A new rounded burner base has been developed with cushioned pads on which the Acousti-Case rests. Openings in the base are equipped with special baffles which remove dirt from the fan air. The inside of the cover is treated with sound-absorbing material.

The Acousti-Case is gray with a red enamel name plate.

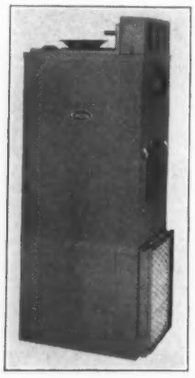
There are four models: Model K-150, ½ to 1½ gph; model K-3, 1 to 3 gph; Model K-4.5, 2½ to 4½ gph; and Model K-7, 4 to 7 gph.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 116.

33—Weathermaker

Carrier Corporation, Syracuse, N. Y., offers Type 58D2 direct fired Carrier Home Weathermakers for small residences—available for both gas and oil—requiring only 23 inches by 30 of floor space. Btu output is 80,000.



Controlled heating, humidfying, filtering and circulation are provided. Air may be circulated and filtered in warm weather. Carrier cooling coils may be installed in the supply duct.

Casting is constructed of 20-ga. steel with leak-tight slip seal joints, and finished with baked wrinkle enamel.

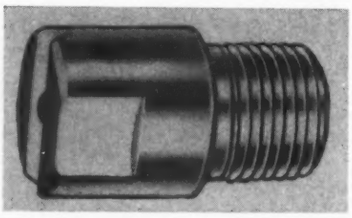
Heat interchanger section includes heat interchanger with combustion chamber, economizer, oil burner, controls and humidifier.

Oil burner is Carrier Type 58D—a two-stage vaporizing type. Gas burner assembly consists of Carrier Ribbon Flame burner, electric safety pilot, solenoid gas valve, gas pressure regulator, hand stop cock and internal piping, for natural, manufactured or mixed gas.

◆

34—Flat Spray Nozzle

Spraying Systems Co., 4021 W. Lake St., Chicago, has just placed on the market a simple flat spray nozzle. Spray pattern is flat with



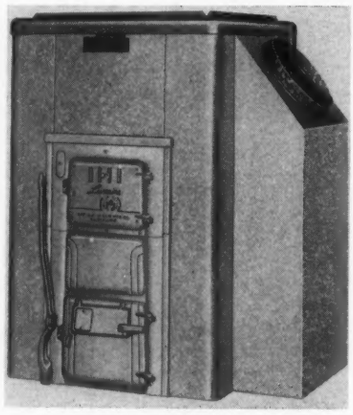
slightly heavy center at higher pressures and can be had in a number of different spray angles.

Nozzles are available in ⅛ to ½ in. male pipe connection. Capacities range from .5 to 10 G. P. M. at 10 pounds pressure and 1 to 20 G. P. M. at 40 pounds pressure.

35—Luxaire Streamlined Model

The C. A. Olsen Mfg. Co., Elyria, Ohio, announces a new streamlined gravity warm air furnace, specially suited for low cost houses.

This model has the standard Luxaire steel heating element which is riveted and welded, has a round inner casing. The outer casing of 22-gauge cold rolled steel, with rounded corners, is attractively finished in two-tone green hammerloid enamel.



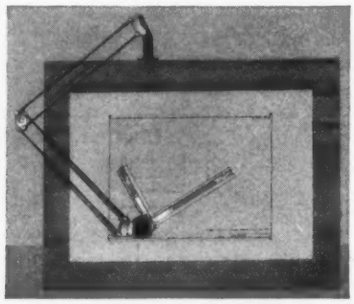
A pair of Cabinet Cold Air Shoes, one of which is pictured in the illustration, complete a modern, streamlined gravity furnace installation. These enameled, Cabinet Cold Air Shoes can be furnished at no greater cost than conventional cold air connections.

This Luxaire streamlined furnace is made in 4 sizes, from 20 to 27-in. drum diameter. Also available in oil fired and stoker fired models.

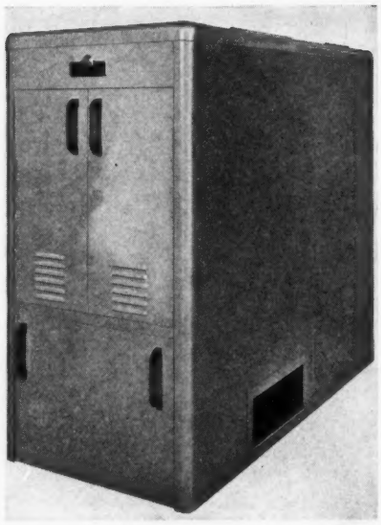
◆

△36—Master-Drafto

The Drafto Company, 107 Walnut Street, Cochranton, Pa., announces a new, low-priced drafting machine, designated as the "Master-Drafto" Model No. 60, which takes a maximum size sheet 24x36 inches.



The arms are constructed of seamless steel tubing, fitted with solid bearings. The scale blades are designed so that any scale, either boxwood or aluminum, can be inserted.



37—Air-Ace Furnace

Iron Fireman Manufacturing Company of Portland, Oregon, and Cleveland, is introducing the Air-Ace line of winter-air-conditioning furnaces; available in three sizes, and adaptable for use with either an Iron Fireman stoker or oil burner. The Air-Ace filters, warms, humidifies and circulates the air.

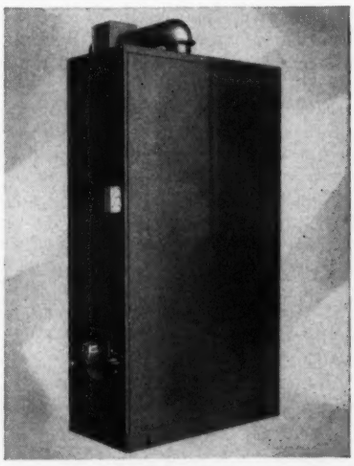
The heater is made of heavy dieformed steel plates, electrically welded; the "tear-drop" shaped radiators provide scrubbing action with reduced friction.

Capacities are approximately 100,000, 130,000 and 170,000 Btu at the register.

◆

38—Closet Furnace K060

Reznor Manufacturing Co., 140 James St., Mercer, Pa., has placed on the market a small, compact gas fur-



nace designed for the single story, cellarless $2,500 FHA house.

Furnace No. K060 (A. G. A. approved) consists of two gas burners, a heat exchanger, and a motor fan.

The K060 has an output rating of 45,000 Btu per hour.

Finish is brown, micro grained baked wrinkle enamel.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 116.

39—Transformer Type Welder

The Eisler Engineering Company of 740 South 13th Street, Newark, New Jersey, has placed a new model A. C. transformer type arc welder on

the market. This machine is available from 100 to 400 ampere capacity—made standard to operate on 220 volts, 60 cycles, A. C., single phase, or any single phase of a polyphase circuit. Can be supplied for 440 or 550 volts at no extra cost.

Outstanding features include: Ease of striking and holding an arc; simplicity of control; rubber covered swivel casters and insulation.

◆

40—Venturi Fan Housing

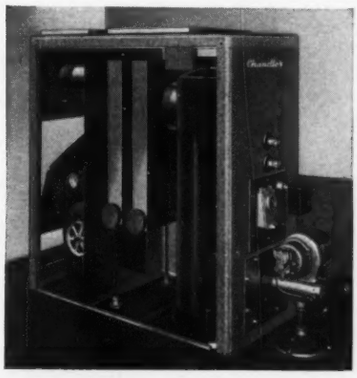
The Commercial Shearing & Stamping Co., of Youngstown, Ohio, offers a pressed steel fan housing, with the

Venturi section drawn down in one operation; in a range of sizes and gauges, for exhaust and ventilating fans and unit heaters.

41—90 Conditioner

Chandler Company, Cedar Rapids, Iowa, announces the Chandler 90 oil-fired winter air conditioner, priced to sell within the budget of the small home owner

The Chandler 90 includes an atomizing oil burner using No. 3 fuel oil, sturdy one-piece electrically welded chassis of heavy gauge steel, double



heat exchanger, quiet 4-speed blower, large filters, automatic humidifier, automatic controls. Capacity is 90,000 Btu at register.

Unit is housed in an attractive steel casing finished in two-tone Hammerloid enamel.

◆

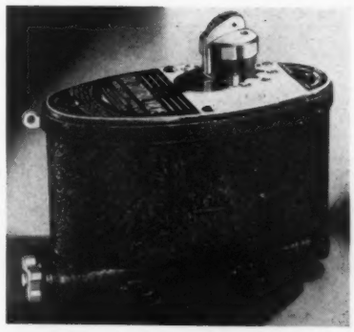
42—Electric Polishers

The Stanley Electric Tool Division, New Britain, Conn., has developed two new polishers for the cleaning and polishing or metal, removal of stains or heat tint caused by welding. These polishers are slow speed (600 rpm) for which proper brushes and compounds have been developed for maximum efficiency. (Proper brushes and polish are recommended, and may be obtained direct from their makers.)

No. 182 polisher is a two-purpose tool—it can be used as a polisher, or a drill chuck can be attached in place of the arbors to make a practical ½-in. drill. Arbors for two or four brushes and ½-in Jacobs chuck are available.

No. 187 polisher has a straight handle and is used for polishing only. Arbors for two or four brushes are available.

Both polishers are equipped with Universal motors for A. C. or D. C. Current in 110, 125, 150, 220, 230 or 250 volts.



43—Oil Level Control

Automatic Products Company, 2450 N. 32nd St., Dept. E, Milwaukee, announces the new Model 240-U series safety constant level oil control. The most important feature is the temperature compensation oil metering provided by a bimetal located at the top of the metering stem. High or low temperatures, above and below normal room levels, change the position of the bimetal and permit metering stem to rise or lower enough to compensate for changes in oil viscosity. In short, the oil flow is accurate, whether burner is operating on pilot, intermediate, or high fire positions.

Other features of the 240-D have been retained—fuel compensation, quick installation of conversion accessories.

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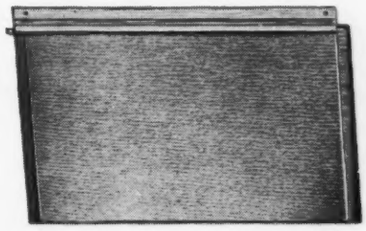
44—Deco Steel Shingles

The Cincinnati Sheet Metal & Roofing Company, 230 E. Front St., Cincinnati, Ohio, offers a new permanent shingle. Ajax Deco-Shingles are made in two sizes (8½x14½ in. and 5½ by 18½ in.). Both sizes have thick butt straight line design. Necessary ridge roll, gambrels, valley and other fittings are designed to combine protection with appearance.



Deco-Shingles have a base of open hearth steel with a copper content known generally as "Copper-Steel." This base is uniformly and heavily coated with a galvanizing coat of pure zinc. And finally the color coat —a zinc pigment paint, developed especially by duPont.

Deco-Shingles lock firmly together, so that no individual shingle can work loose to rattle, and the insulation space (provided by the thick butt design) acts as a non-conductor of sound. As each shingle is locked into the preceding shingle, two galvanized roofing nails are driven. All nail heads are concealed.

Association Activities

New York State

The New York State Metal, Roofing & Air Conditioning Contractors' Association, Inc., is being held March 25, 26 and 27 at the Hotel Onondaga, Syracuse. The program is now complete and includes the usual registration, call to order, appointment of committees, followed by the president's message on the morning of the 25th.

Following luncheon there will be an address of welcome by the mayor of Syracuse, and an address on government statistics by Hon. John M. Carmody.

J. H. Van Alsburg of Hart & Cooley Register will talk on Registers—"Why Use Them."

D. D. Hamilton of the Koppers Company will talk on better built-up roofs.

The merchandisers and affiliated manufacturers and jobbers will give a stag party, entertainment, luncheon and refreshments at 7 p. m.

On Wednesday morning at the opening session in the Hiawatha Room, William P. Haines of Laverack & Haines, Inc., group managers, will talk on group compensation news.

"Metallurgical & Engineering Aspects of Sheet Copper Construction" will be discussed by Dr. R. A. Wilkins, vice president of Revere Copper and Brass.

J. Stoner, president of the Merchandisers Auxiliary will address the association at 11 a. m.

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A banquet is scheduled for 6:30, followed by entertainment and dancing in the ballroom.

Members only will meet in the Hiawatha room on Thursday morning for reports of officers, committees, nomination and election of new officers and their installation.

Clarence J. Meyer, State Secretary,
567 Genesee Street, Buffalo.

◆

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The Roofing and Sheet Metal Crafts Institute, Inc., met on February 26th and elected the following officers for the year 1941:

President—Albert Neuscheler
Vice Presidents—Lawrence C. Corvi, J. J. Gallo, Irving Koppelson, Otto Muller, Thomas J. Wynne
Chairman of Board—Richard H. Freyberg
Financial Secretary—Alfred E. Neulander
Treasurer—F. William Tischler

Charles Muller who is rounding out fifty years as an employer in the sheet metal business, presented a paper before the meeting in which he proudly set forth that for two hundred years back his ancestors had been sheet metal men and fifty years ago when he started his business his three brothers each started a similar sheet metal business in each of the other Boroughs of New York City. He built the cornice and did the sheet metal work on many famous landmarks in Brooklyn. He pointed out that at that time he had to show the architects how to draft their plans. He said that he does not remember having had any troubles with unions during all the time that he has been in business. Whenever he needed four, five or twelve men he would call the union and get them. He pointed out however, that through the years competition has become very keen but that the quality of work has fallen to what he hopes is now its lowest level. He suggested that members of the craft adhere closely to the specifications adopted by the institute.

Karl Gohlke, whose firm was established in Brooklyn about the same time, delivered a talk in which he showed that minimum specifications were at least fair to builders and that people with "offices in their hats" have been defrauding builders and building owners. He described the fares by which these frauds were being practiced and how they could be brought out into the limelight.

Mr. Neulander the outgoing president, presided at the meeting and the election and he reported on the accomplishments of the institute during his term in office. He pointed out that the institute had been effective in stopping a proposed 2 per cent increase in Compensation rates and that it furthermore had cooperated with City authorities to keep "fly-by-nights" out of the roofing business. He delivered a complete report concerning all activities of the institute and called upon I. Popik, Chairman of the Committee of Insurance Guarantees, who delivered his report on the effectiveness of giving to property owners, bankers, and real estate managers Five Year Guarantees, backed by the Hartford Fire Insurance Company, without charge to the building owners.

After the election Albert Neuscheler, president of the firm of A. C. Gmelin, which has operated in business during the past sixty years, gave his speech of acceptance and thanked the members of the institute for his election. He proposed a program of expansion which would serve for the further betterment of the welfare of the entire craft throughout the United States.

Irving Payson Zinbarg, Secy.

(*Continued on page* 105)

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1941

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WE hope you'll never be in such a "bad jam" that your work is stopped or delayed by lack of steel—especially if you are engaged in the vitally important work of defense production. But whether you are or not, you'll find Scully a pleasant, reliable and prompt source of supply. Every year hundreds of letters like the one quoted above express the appreciation of gratified customers for some example of the service that has made Scully famous.

And it's a rule at each of our eight warehouses to give that kind of service to every order, large or small, rush or not. Why not see for yourself? The next time you need steel, steel products, copper or brass "call Scully—and relax."

Scully Service

The Mark of Service

ALLOYS
ANGLES, HOT ROLLED and COLD ROLLED
ARCHES (CORRUGATED)
BABBITT
BANDS and HOOPS
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ST. PAUL-MINNEAPOLIS · CLEVELAND · PITTSBURGH · BALTIMORE

UNITED STATES STEEL

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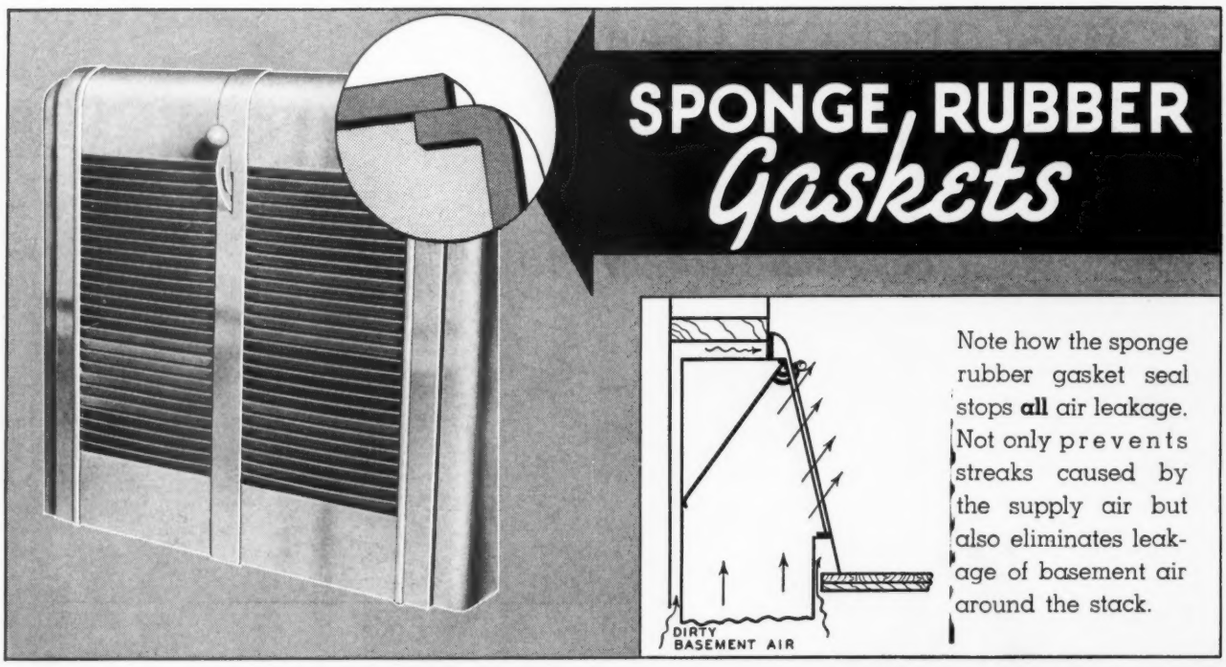


SPONGE RUBBER *Gaskets*

Note how the sponge rubber gasket seal stops **all** air leakage. Not only prevents streaks caused by the supply air but also eliminates leakage of basement air around the stack.

AIR CONTROL *Gravity* REGISTERS

Your Assurance of Streakproof Installations

Sponge rubber gasket—the improved method of sealing between wall and register that has proved so efficient on Air Conditioning Registers is supplied on all AIR CONTROL Gravity Registers. This gasket, which will never harden or become brittle, makes an air tight seal for it seals at the wall line!

Held in a channel, the gasket projects 3/32" beyond the register—when screwed up to the wall the compression of the rubber takes care of any unevenness in the wall.

Not only do AIR CONTROL Gravity Registers give you a better seal—they are also **easier to install.** With AIR CONTROL it is not necessary to flange and fit the stackhead, trim for screw holes, etc.—simply insert into stackhead and screw to wall.

If you are not using AIR CONTROL Gravity Registers—write for complete information at once!

•

Complete stocks of AIR CONTROL Products carried in principal cities—Dual Control Air Conditioning Registers and Grilles, Popular Priced Directional Flow Registers, Floor Registers and Faces, Attic-Louvers and Damper Control Sets.

AIR CONTROL PRODUCTS, INC.
MUSKEGON MICHIGAN

Investigate MOR-MAC Tubular WINTER AIR CONDITIONERS

MOR-MAC is a Winter Air Conditioner that is really different, yet it is designed around an old and basic principle of heating — the tubular boiler. It is not an adaptation of a gravity furnace but is designed from the ground up for forced warm air.

As one skilled in the mechanics of heating and air conditioning, you will recognize in the cut-away drawing below the features which enable Mor-Mac Units to attain a higher degree of efficiency than any other units in their size class. Note particularly the Mor-Mac Heat Tubes and the exclusive Mor-Mac Turbulator inside each tube.

The ECONOMIZER

Acts as secondary heating surface and extracts the last practical degree of heat from the products of combustion. Pre-heats the cool air on its way to the filter.

The FILTER

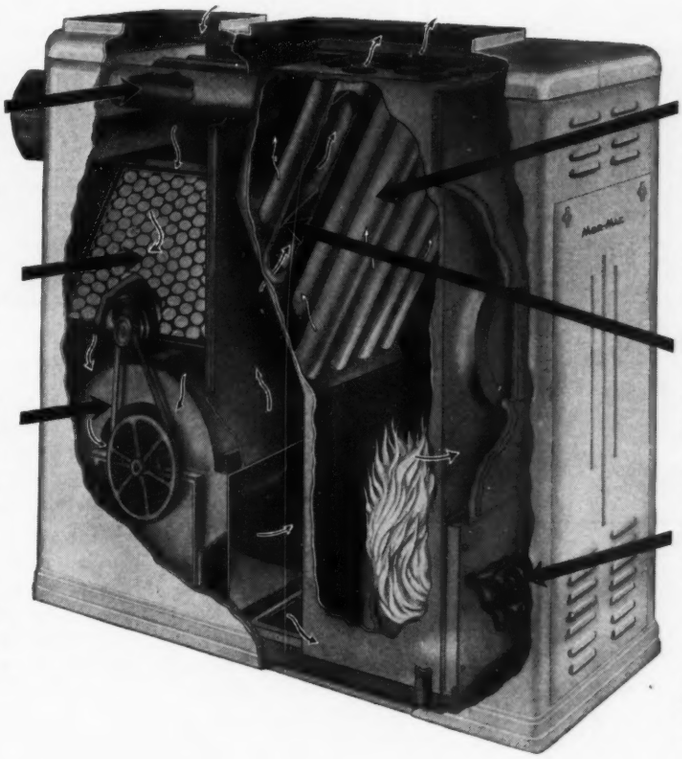
A "Fiberglas" Filter of ample capacity. Removable and replaceable.

The AIR CIRCULATOR

A low speed, high efficiency blower designed especially for domestic air conditioning. Equipped with capacitor motor.

The HUMIDIFIER

Located in plenum chamber. Automatic heat-controlled drip type. Most efficient and dependable.



The HEATING CHAMBER

A series of 3" tubes of heavy copper-bearing steel. Provides an exceptionally large amount of direct heating surface. Each tube equipped with a Turbulator.

The TURBULATORS

An exclusive Mor-Mac feature. Each heat transfer tube has a spiral metal insert called a Turbulator. Acts as an indirect heating surface, increases air travel, and imparts a swirling motion to the air passing thru tube, causing it to scrub the hot inside of the tube and insuring thorough, uniform heating. The maximum amount of the thermal energy released in the products of combustion is absorbed by the air.

The BURNER

The Mor-Mac uses either oil or gas for fuel. When gas-fired, the unit is sold complete with burner as an A.G.A. approved unit.

Study the Mor-Mac features: High Efficiency — Unusually Heavy Gauge, All-welded Steel Construction — Completely Tooled and Die-stamped, resulting in exceptional beauty and ease of assembly — Quiet Operation — beautiful green, spatter-coat Hammerloid Enamel Finish. Priced below competition for the small and medium size new home market. Price guaranteed for your seasonal needs in spite of re-armament demands. A Factory Sales Representative is located in your immediate territory. You are urged to write or wire today for mechanical specifications, prices, etc.

MORRISON STEEL PRODUCTS, INC.
601 AMHERST STREET BUFFALO, N. Y.

Your BEST INSURANCE Against

Speed-killing "Doubtful" Screws

Guarantee
OF HIGHEST QUALITY
To assure satisfactory performance, Parker-Kalon Fastening Devices are made to exacting specifications covering dimensional and physical characteristics which are checked at every stage of manufacture, and passed upon by Parker-Kalon's Quality Control Laboratory. Should this product prove faulty in any way, replacement will be made without charge.
PARKER-KALON CORPORATION
NEW YORK, N. Y., U. S. A.

A Guarantee that's backed by Parker-Kalon's Unique Quality-Control!

Only a handful of "doubtful" screws may lower the quality of a full day's output of a product. Besides, consider how screws which fail to function properly can slow up production and bring up costs.

That's why Parker-Kalon's Guarantee against "doubtful" screws – *screws that look all right but of which a percentage fail to make satisfactory fastenings* – is vitally important to you. This Guarantee is your assurance that the Parker-Kalon Screws you use have met the rigid tests imposed by the Parker-Kalon Quality-Control Laboratory. From raw material through the various processes of manufacture, inspections and tests guard against "doubtful" screws.

Specify Parker-Kalon and get Fastening Devices you can depend on to live up to the performance promises made for them. Parker-Kalon Corporation, 190-192 Varick St., New York, N. Y.

COSTS NO MORE *to get this Parker-Kalon Quality-Control Guarantee with every box of....*

Hardened Self-tapping Sheet Metal Screws

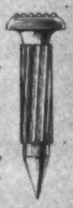
Sizes and head styles for assembling light and heavy sheet metal

Hardened Screwnails

For fastening sheet metal to wood securely

Hardened Masonry Nails

For fastening to brick, mortar, concrete, etc. easier and quicker



SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS

Quality-Controlled **PARKER-KALON Fastening Devices**

Association Activities . . .

(*Continued from page* 100)

Pennsylvania

At a meeting of the Board of Directors of the Sheet Metal and Roofing Contractors' Association of Pennsylvania held December 20, 1940, at Pittsburgh, it was decided that the 1941 Convention be held at Greensburg, Pa., on May 15 and 16, 1941, with headquarters at the Penn Albert Hotel.

M. F. Liebermann, Secretary.

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Fox Valley

The 1941 officers of the Fox Valley Furnace & Sheet Metal Contractors Association, elected at the January 20 meeting in Elgin, Illinois, are:

President—Jack Stowell, Aurora. Re-elected.
1st Vice President—George Bushman, Aurora.
2nd Vice President—Alvin Lohbauer, Elgin.
Treasurer—Andrew Lind, Dundee. Re-elected.
Secretary—Fred R. Lamp, Elgin.
Sgt.-at-Arms—William Klinkey, St. Charles. Re-elected.
Directors: Henry Heffelfinger, Oswego; George Lennert, Naperville; Phil Ries, Aurora; Charles King, Geneva; Fred Nolting, Elgin.

◆

Tampa

The Master Sheet Metal & Roofers Association, Tampa, Florida, has re-organized. Local sheet metal contractors and roofers are making an effort to get back some of the business that has been getting away from the legitimate shops and is interested in getting a good sheet metal and roofers' code.

L. S. Solomon, Jr., Secretary,

◆

Cook County, Illinois

At the February 18 meeting of the Sheet Metal Contractors' Association of Cook County, Paul Davis, district manager of The Cheney Company, spoke on flashing and its uses.

1941 officers of the association are:

President—Aubrey Sykes, of the Sykes Sheet Metal Products
Vice President—W. J. Perkinson of Perkinson & Brown
Treasurer—Albert Wagner, Jr.
Secretary—G. P. Myers

A. L. Sykes, President.

◆

Florida

Mack Fillingham, president of The Roofing & Sheet Metal Contractors Association of Florida, has been ill for the past few weeks but is again around and working on convention plans—April 18 and 19 at Jacksonville.

The president, Mack Fillingham of Jacksonville, and secretary Burgess are now members of the Technical Advisory Board of the Florida State Chamber of Commerce to represent the roofing and sheet metal contractors of Florida. Members are invited to write and submit problems that can be worked out through the State Chamber of Commerce.

L. A. Burgess, Secretary-Treasurer.

◆

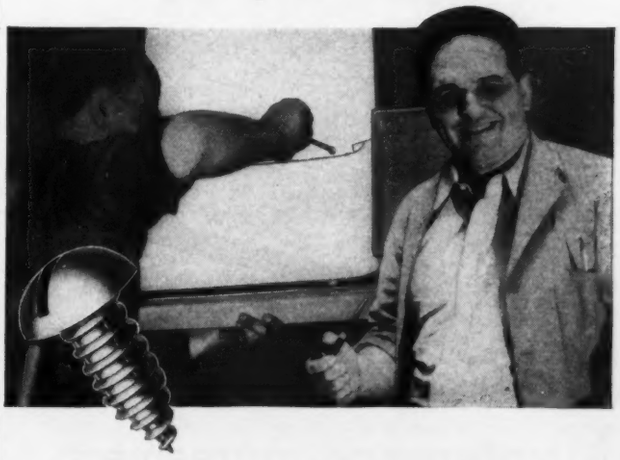
Illinois

The Sheet Metal Contractors Association of Illinois sent the final draft of the Illinois licensing bill to Representative Warren L. Wood (Republican-Plainfield) on January 25th. This is known as House Bill No. 152, "A Bill for an Act to Regulate the Business of Warm Air Heating Contractors and to Provide for the Registration of Same."

This Bill is now waiting on the Judiciary Committee for hearing. I would suggest at this time that you write to the Representatives from your district on your business stationery, informing them that you understand a Warm Air Heating Contractors License Bill is being introduced and that you would like to have a copy of the Bill. This will create interest among the Representatives from our various districts and let them know that our members are interested in this legislation.

Wm. W. Johns, Secretary.

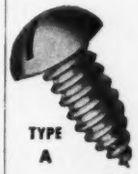
"SURE, MY PROFIT IS GOOD—no 'doubtful screws' slow up the work"



"For better jobs at lower cost, it pays to use only Parker-Kalon Screws!"

MORE than 50,000 sheet metal workers know that to use genuine Parker-Kalon Sheet Metal Screws is the surest way to get better fastenings at lower cost. They know that the name "Parker-Kalon" safeguards them against "doubtful screws"—the kind that *look* right but some of which don't *work* right . . . heads breaking off, threads stripping, screws failing to draw up tight.

Parker-Kalon Screws are your guarantee of stronger, quicker fastenings *every time.* For these Screws are made to highest standards by the originators of the Sheet Metal Screw . . . and Quality-Controlled throughout manufacture by the famed Parker-Kalon Laboratory. For better jobs at more profit . . . demand Parker-Kalon Screws. No substitute will do the job as well! Send for free samples. Parker-Kalon Corporation, 190-192 Varick Street, New York, N. Y.



Quality-Controlled

TYPES, SIZES, HEAD-STYLES FOR EVERY SHEET METAL ASSEMBLY

SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS

SEND FOR SAMPLES

PARKER-KALON *Sheet Metal Screws*

Parker-Kalon Corporation,
190-192 Varick St., New York, N.Y.
Send Free Samples of Type A and Type Z Screws.

Company Name

Address

City & State

INTERNATIONAL PRESENTS

TEN YEAR
Maintenance Agreement

No other furnace can be sold under such an agreement.

You can tell your prospect you will take care of the furnace for ten years without charge—except for smoke pipe repairs or cleaning.

You get paid for any necessary repair work under the Ten Year Maintenance Agreement.

LIKE INSURANCE

Most everyone understands insurance. This agreement is like a full coverage policy. The owner has all necessary repairs without cost, and the term of coverage is ten years—no yearly premium to pay.

EVEN COVERS GRATE BARS

Yes—free replacement of grate bars is included, and with it goes a labor allowance to the dealer for installation.

Think of being able to say to your prospect:

"With this agreement your International Economy Heater will be kept in repair by me for ten years at no charge."

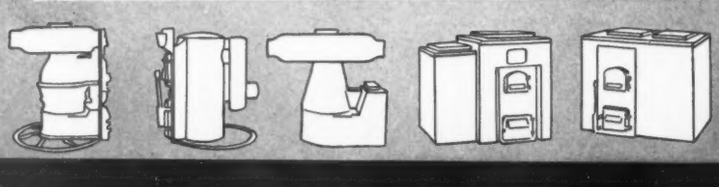
What owner would not avail himself of that protection once it is explained to him.

No other furnace is sold under such an agreement.

Write for full information to Dept. A-3, and use this biggest selling help ever offered the heating trade.

INTERNATIONAL HEATER COMPANY
UTICA, N.Y., U.S.A.

WESTERN OFFICE AND WAREHOUSE • 1933 WENTWORTH AVE., CHICAGO, ILL.
NEW ENGLAND OFFICE AND WAREHOUSE • 110 CHESTNUT ST., NASHUA, N. H.
STOCKS CARRIED WITH WHOLESALERS IN ALL PRINCIPAL CITIES



Association Activities . .

Chicago

The Furnace-Air Conditioning Sheet Metal Institute met on February 13 and again on February 27. The discussion at both meetings centered around the Illinois licensing bill introduced into the Illinois legislature. Under this act every firm engaged in warm air heating must have in its employ a person holding a license. Also everyone who puts in repairs, alters any furnace or air conditioning system or even resets a furnace or adds a new furnace smoke pipe, must hold a license. The initial license fee is $50; renewal $5 each year.

Most contractors favor this licensing act, but some are in doubt about certain objective features of the bill or feel that certain sections are too loosely worded or not specific enough in meaning.

As usual, refreshments were served.

Louis E. Drehobl, President.

◆

Tenth Annual Forced Warm Air Short Course

The tenth annual forced warm air conference will be held at Michigan State College, East Lansing, on March 25, 26, 27 and 28, sponsored by the National Warm Air Heating and Air Conditioning Association.

The student body will be divided into four groups:

1. A beginners' group using a small house design presenting many structural difficulties.
2. Advanced students including those who have attended previous sessions or those who have had a considerable amount of experience. The house plan for this group will be more complicated and will require heating in two or more zones.
3. Fifteen to 25 students will engage in the development of a cooling installation design, using the plans of an undertaking establishment with living quarters above.
4. Due to increasing demand, another group will work on the design of a conversion system. That is, a house heated by gravity warm-air to be converted to a forced warm-air heating system.

The class rooms will be attended by a large number of instructors including B. F. McLouth, McLouth Air Conditioning Corporation; S. Konzo, University of Illinois; C. W. Nessell, Minneapolis-Honeywell Co.; W. D. Redrup, President of Majestic Company; Prof. Wayne Cockrell; and Profs. Reuling, Pesterfield and Campbell.

Edwin A. Scott, Editor Sheet Metal Worker, will address the Wednesday Luncheon on "A Good Cost Accounting and Bookkeeping System."

Mr. Knollman, Williamson Heater Co., will address the Thursday luncheon on "Points Essential to Successful Selling."

In addition, there will be luncheon and dinner lectures on various subjects connected with the industry by qualified speakers.

The cost of students attending is nominal. Dormitory, meals, course fee and laboratory fee—$13.00 for the four days. Hotel room accommodations would make the cost slightly higher.

This is a school, and not a convention . . . a real opportunity for hundreds of men to add to their knowledge of the warm air heating industry. For an advance program, write to George Boeddener, Managing Director, National Warm Air Heating and Air Conditioning Association, 145 Public Square, Cleveland.

◆

Heating and Air-Conditioning Conference

The sixth Iowa Heating and Air Conditioning Conference is to be held at Iowa State College April 8, 9 and 10 and an invitation is extended to manufacturers to exhibit their products in connection with the conference.

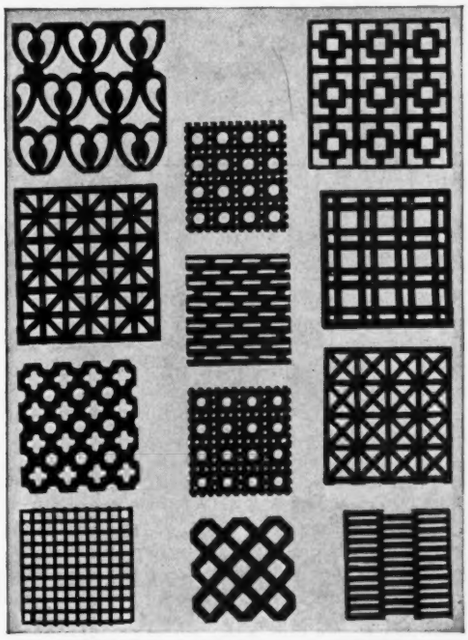
The program this year is designed to give practical help to dealers and installers of equipment. It is felt that these are the men who need help in order to do a better job of merchandising and installing good equipment.

Reservation of space is requested at an early date.

Eugene O. Olson, Conference Director,
Iowa State College, Ames, Iowa.

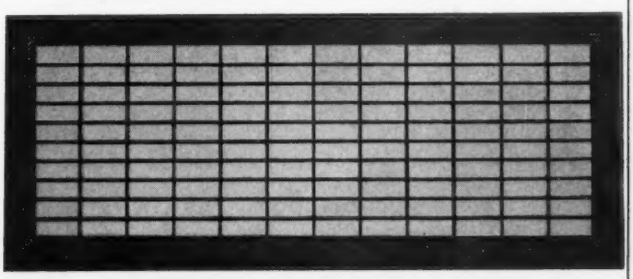
PERFORATED METALS AND INDUSTRIAL SCREENS

IN STOCK FOR PROMPT DELIVERIES



Fancy panels constructed for easy bending. These panels are especially adapted for use as stove casings and similar applications, made to your specifications.

We make a complete line of perforated metals for Screening, Sifting, Draining, Machinery Guards, etc.



COLD AIR FLOOR FACES

SIZE OF MESH 5/8" x 1 13/16"

Cold air faces substantially constructed of flat bar stock, having long strips made of .083 (14 gauge steel) x 1/2" deep, and strips running short way of .083 (14 gauge steel) x 3/4" deep. Close mesh—heel proof, no extra cost. Large open air capacity; also beveled edges, made in all standard sizes. Furnished in Japanned black, and oak grained finishes.

Write today for Catalog.

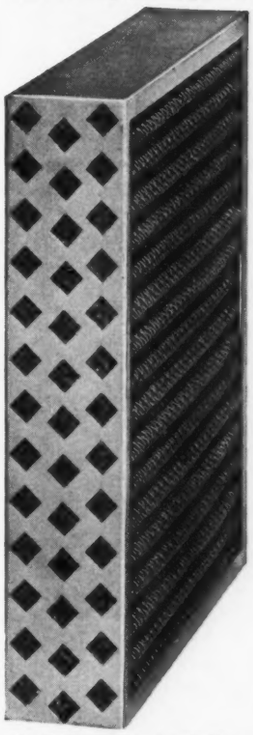
STANDARD STAMPING & PERFORATING CO.
3137 W. 49th Pl. Chicago, Ill.

WHAT'S YOUR AIR FILTRATION PROBLEM?

Put it up to AIR-MAZE Engineers to Solve it for You!

● When it comes to air filtration problems—whether it's the removal of dust, grit, grease, ink, paint, oil, moisture or other substances—there are but few that cannot be solved satisfactorily and economically with *standard* AIR-MAZE filter panels.

While all the various AIR-MAZE panels all have in general the same unique all-metal filter element—which embodies the swirling baffle-impingement principle, and which incorporates the exactly graduated progressive density feature—they are each specifically adapted to the special type of service they are required to perform. And experience shows that they do the jobs for which they are intended exceedingly well.



Occasionally however, a tricky problem arises which cannot be licked by the use of any of the AIR-MAZE *standard* panels. This is where AIR-MAZE engineers go into action. We have quite a staff of them with many years of training and experience in the complexities of air filtration. These men like nothing better than a chance to sink their teeth into a tough problem.

Maybe they can help *you*. At least it will cost you nothing to consult with them and they may save you a lot of trouble, time and money.

Write us today, stating your problem. We'll make a study and recommendation without obligation to you.

AIR-MAZE CORPORATION
5130 HARVARD AVE. CLEVELAND, OHIO

AIR-MAZE
DEPENDABLE AIR FILTERS FOR EVERY APPLICATION

Asbestos Protected DUX-SULATION

for SOUND ABSORBING AND INSULATING, HEATING, VENTILATING AND AIR CONDITIONING DUCTS

Insulates Better

Absorbs 70% of noises . . . 75% Thermal Insulating Efficiency (K Factor .27 BTU) . . . Prevents Condensation, (Sweating or rusting ducts) . . . Low Frictional Resistance, (.f 0.0001322) for free air flow . . . Moisture Proofed . . . Built to last, will not chip, flake or crack . . . Asbestos Protected.

Compare the two diagrams below

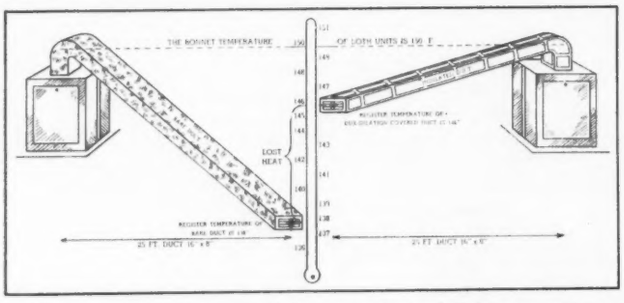


Figure 1 illustrates that 100 square feet of Asbestos Protected DUX-SULATION will raise the register temperature from 138° to 146° without increasing the bonnet temperature. This means more heating comfort for the same fuel.

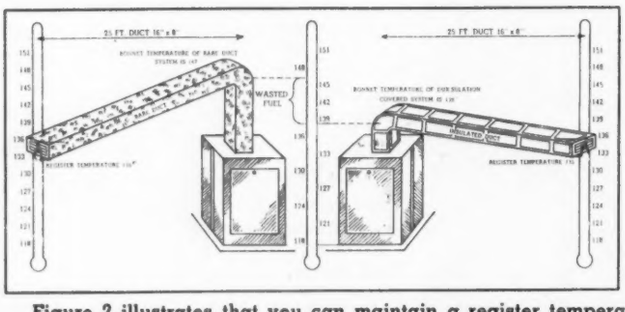


Figure 2 illustrates that you can maintain a register temperature of 135° with a bonnet temperature of 139° if the duct is covered with Asbestos Protected DUX-SULATION, whereas to hold 135° register temperature on a bare duct run you would have to have a bonnet temperature 12° higher or 147°. The higher bonnet temperature requires more fuel.

Eliminate fuel-waste and increase room comfort by covering all ducts with Asbestos Protected DUX-SULATION.

Write for Bulletin 497

GRANT WILSON, INC.
4101 West Taylor Street — CHICAGO

PLANT RUBBER & ASBESTOS WORKS
537 Brannan Street — SAN FRANCISCO

AIR CONDITIONING UTILITIES CO.
8 West 40th Street — NEW YORK

ATLAS ASBESTOS CO., LTD.
110 McGill St. — MONTREAL, CANADA

Association Activities . .

(*Continued from page* 106)

New York State

The Crews Bill No. 410, relating to a proposed licensing of air conditioning contractors, was once again introduced in the New York Assembly on January 27th. The bill is an act introduced by Mr. Crews, requiring the licensing of contractors engaged in the construction, installation, alteration, maintenance and repair of air conditioning systems, and providing for the inspection of such systems in buildings of all classes within the state of New York.

H. A. Daniel of the Atlas Roofing Company, Newburgh, N. Y., advises that "There are many objectional features and I think it would be advisable to note the matter in the 'American Artisan', and suggest that people doing air conditioning work should write, see or telephone their representatives and Senators, asking them to oppose the bill."

◆

Midwest Stoker Annual

The Midwest Stoker Association at its annual meeting held in Chicago on January 28th elected its officers for 1941 and took a rosy view of business prospects for future months. Mount Burns, manager of the Chicago Retail Stoker Division of the Link-Belt Company, was chosen president to succeed L. G. Briggs.

Other officers re-elected were E. M. May, Chicago branch manager of the Combustioneer Division of Steel Products Engineering Company, vice president, and E. W. Jones, office manager in Chicago for the Iron Fireman Manufacturing Company, secretary-treasurer. Marc G. Bluth was reappointed manager of the Association, which is a retail organization of Chicago sales agencies.

D. J. Dowe, district manager of the Norfolk & Western Railway's Coal Bureau, Chicago, exhibited a sound picture in technicolor entitled, "The Power Behind the Nation."

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on page 116.

117—Nu-Arc A. C. Welder

Nu-Arc Welder Sales Division of Electric Arc, Newark, N. J., is distributing a 4-page folder covering their new Nu-Arc welder for either light or heavy work with any electrode. Four models are available.

◆

118—Screws, Bolts, Nuts, Rivets

Central Screw Company, 3501 Shields Ave., Chicago, is offering a 115-page 4-color Catalog "K", illustrating and describing their complete line of screws, bolts, nuts and rivets. Technical information on screws, bolts, nuts and rivets is also provided.

◆

119—Airplex Filters

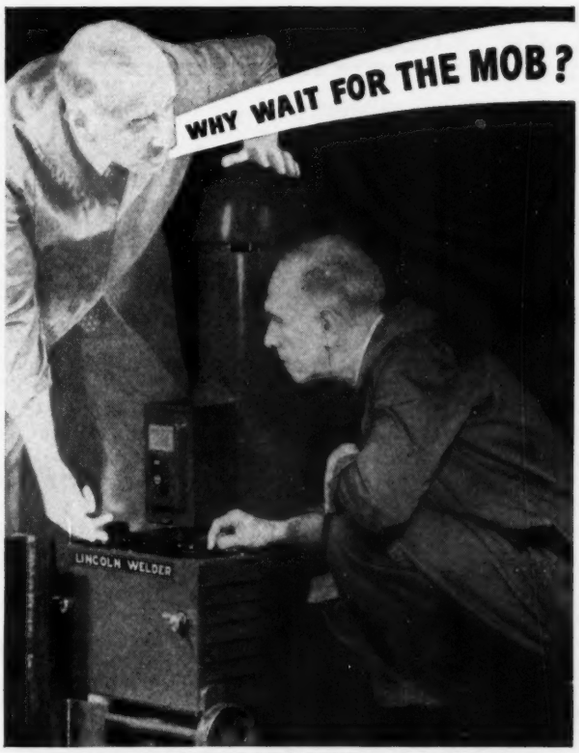
Davies Air Filter Corp., 390 Fourth Ave., New York City, is distributing a 6-page folder covering Airplex cleanable and throwaway filters. The text covers efficient filtration, sturdy construction, the filter medium, cleaning, filter life, upkeep, performance and sizes.

◆

120—Spray Painting Equipment

The DeVilbiss Company, 300 Phillips Avenue, Toledo, Ohio, has issued an attractive new catalog covering its 1941 line of automotive, portable and specialty spray painting equipment.

The catalog covers, in condensed form, complete spray painting equipment for exterior and interior painting, automobile refinishing, and equipment for automotive service, as well as air and fluid hose.



ALTER EGO: Literally "one's other self"—the still, small voice that questions, inspires and corrects our conscious action.

ALTER EGO: So, you're still luke-warm about arc welding?

Well, our competitors don't use it. Our customers don't ask for it.

ALTER EGO: Oh, so you want to wait for the mob? Why not strike out for yourself?

But we have only a few applications for arc welding.

ALTER EGO: Right! We *have* only a few, but we *could have* hundreds. We could go out after new lines of business with arc welding. We could take on some of the work of overloaded factories around here. We could boost our income, cut our costs and speed up all our repair and construction work.

Good! I'm for stepping out and doing things better, faster and cheaper than the other fellow. For once, let's get the jump on our competitors.

• •

LINCOLN SUGGESTS: The sheet metal shop manager who is looking for ways to *increase business and decrease costs* will find helpful tips in Lincoln bulletins and books. Are you getting the pictorial how-to-do-it bulletin, "Welding Time"? We'd be glad to put you on the mailing list. No obligation.

Copyright 1941, The Lincoln Electric Co.

LINCOLN "SHIELD-ARC" WELDING THE LINCOLN ELECTRIC COMPANY Cleveland, Ohio
Largest Manufacturers of Arc Welding Equipment in the World

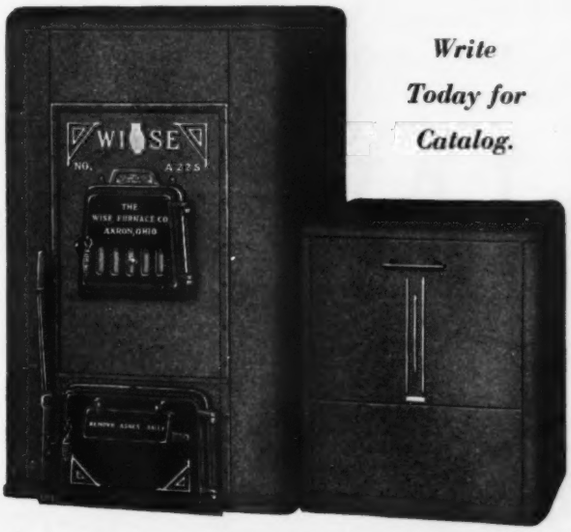
. . . a live line means action!

YOU GET IT When You Sell

WISE FURNACES!

Whether it's fishing or furnaces a "live line" means you're going to be pretty busy for a while.

In these days of tough competition you need a furnace line that will sell readily in order to assure yourself of a real share of profits in the gravity heating and warm air conditioning field. Wise has such a line. The Series "A" illustrated at top and the Air Conditioning Unit shown below are but two of the units which will enable you to sell many tough jobs by pointing out their superior features to your prospect. They afford real heating comfort season after season with little if any attention, and with surprising economy. We suggest you write today for further information on the "live line" for 1941.



Write Today for Catalog.

Warehouse stock is also carried in Kansas City, Mo.

WISE FURNACE COMPANY
AKRON OHIO

WANTED.....

YOUR TOUGHEST JOBS

of Air Conditioning. By an engineering graduate who knows what proper air distribution is all about. Good looking and willing to go to work for you for a price that makes me competitive even on big housing projects. Very adaptable nature — will deflect air upward, downward, to the right or to the left. Face vanes are instantly adjustable. There isn't a problem of air distribution I can't lick. Give me a try!

PLIAVANE

SINGLE VALVE AND ADJUSTIBLADE

MULTI-SHUTTER

REGISTER

Send for Catalog No. 41R— just off the press

T & B TUTTLE & BAILEY, Inc.

NEW BRITAIN, CONN.

NEW YORK CHICAGO PHILADELPHIA

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on page 116.

121—Spot Welders by Acme

Acme Electric Welder Company, Huntington Park, Cal., is distributing a 4-page folder entitled "Spot Welders by Acme." This is Bulletin No. 53 covering Types PT1 and PT2 with specifications and other information.

◆

122—H. & C. Catalog No. 41

Hart & Cooley Manufacturing Co., Holland, Michigan, offers Catalog No. 41—gravity registers and accessory items. This catalog has been prepared on the basis of making reprint pages available for jobbers and dealers. Bulletin numbers are shown at the bottom of all pages. Reasonable quantities are available without charge.

The new fin-type baseboard register, sidewall register and intakes are shown on pages 31-34.

◆

123—1941 Calendars

David Levow, 308 West 20th St., New York City, is offering their 1941 calendar, having on the last page reference tables for the trade, giving information as to gauges of metal, expansion and contraction; diameters, circumference, and areas of circles; contents of round tanks; physical properties of metals; sizes of drills to be used for United States standard taps; also weights and measures and useful rules for calculation.

◆

124—General Controls Catalog

General Controls Company, 801 Allen Ave., Glendale, California, has just published its 1941 Catalog. It consists of 48 pages with engineering description and charts, performance tables and diagrams of each item in the company's line of automatic pressure, flow and temperature controls.

In the catalog are listed the new V-300 gas regulators, for low pressure installations; a new manual reset valve, the MR-1-2, for control of liquids, vapors and gases, and the complete new line of T-80 series thermostats.

◆

125—Building Materials and Structures

The United States Department of Commerce, National Bureau of Standards offers Report BMS57—Building Materials and Structures. This booklet is the result of a questionnaire circulated to 148 field offices of the Home Owners' Loan Corporation and Federal Housing Administration in 48 states and the District of Columbia on roofing practices and conditions—distribution, durability, unsuitability and restrictions of various roofing materials; customary roofing practices; materials for nails, valleys, flashings, gutters, and downspouts; causes of premature roof failures; and the use of new types of roofing materials. The data are presented graphically where possible.

Copies are on sale by the Superintendent of Documents, Washington, D. C.—Price 10 cents.

◆

126—Machine Shop Practice in 12 Easy Lessons

Leighton A. Wilkie, president of Continental Machines, Inc., of Minneapolis, 1203 Thacker Street, Des Plaines, Illinois, has produced an Educational Calendar—a series of twelve posters outlining the basic principles of machine tools and metalworking. The aim is to form a clear foundation for apprentices. Each lesson is automatically displayed for one month. Each month a new step is presented in a comprehensive manner, so that at the end of the twelfth lesson, one learns the principles of metal cutting with machine tools. An illustrated diagram accompanying shows the great need that exists for trained craftsmen.

The eleven machines shown in this study include all the primary forms of machine tools—the lathe, chip production, the shaper, the milling machine, the drill, the saw, the file, the broach, the vertical mill, the grinder, the honing, and the superfinishing.

AEROLUX

Any Combination of Filter-Furnace-Fans May Be Called an "Air Conditioner",

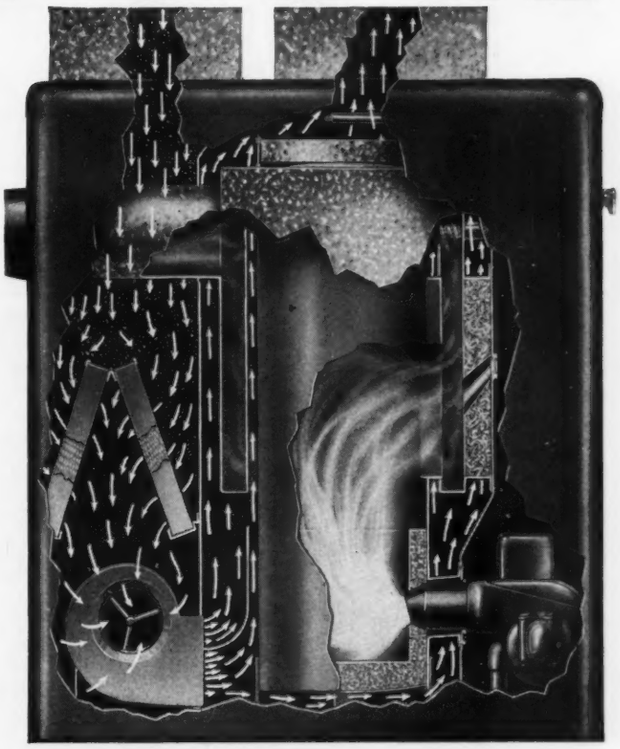
but there is only one AEROLUX, designed and engineered from the first to do a definite job in a definite way.

7 Gauge Copper Steel combustion chamber and radiator give high resistance and long life in the presence of corroding fumes and humidified air. All joints electrically welded.

Twin blower fans are driven by direct-connected, automatically-controlled, multi-speed motor.

Regulates itself with automatic precision to meet all temperature changes.

All working parts easily accessible. AEROLUX wins and holds friends for life. A few worth-while territories and franchises are still available to dealers who want to cash in on the huge national building boom.



SEE US, PHILADELPHIA OIL BURNER SHOW

S. T. JOHNSON CO.

940 Arlington Avenue, Oakland, California
401 North Broad St., Philadelphia, Pa.

YOUR 1941 EXTRA PROFIT MAKER!

RESEARCH SELF-SEAL *RE-FIL-ABLE AIR FILTER*

Write for DATA SHEETS on the complete RESEARCH Air Filter Line.

RESEARCH PRODUCTS CORP. RP MADISON, WIS.

NO. 300 SERIES WITH HINGED WIRE GRIDS

Research Air Filter No. 300 Series is the "easiest to change of all Re-Fil-Able Filters." The self-sealing pad is held snugly between hinged wire grids which snap together like a purse. When filter is dirty, simply unsnap grids and insert new pad. The No. 300 is just one of a number of RESEARCH AIR FILTERS designed to protect performance and promote efficiency in heating and ventilating equipment. Dealers like the extra profits derived from selling and servicing RESEARCH AIR FILTERS.

"The Easiest to Change of all
RESEARCH RE-FIL-ABLE AIR-FILTERS"

RESEARCH PRODUCTS CORP., MADISON, WIS.

FASTEST METHOD OF CUTTING SHEET METALS

STANLEY UNISHEARS

No. 144A Unishear handling a tough cutting job in Railroad Repair Shop

This money-saving equipment is 100% portable. Unishears will cut any shape – straight, angles or curves – with hairline accuracy. No waste or distortion of metal. Speed, as you feed, up to 15 feet per minute. Universal motor can be plugged into any lighting circuit.

No. 144A Unishear has a capacity of 12 U. S. Gauge (7/64") hot rolled steel. Two lower capacity portable models are available and five stationary models to handle sheet metal up to 10 gauge.

Ask for demonstration or catalog.
Stanley Electric Tool Division, The Stanley Works, New Britain, Conn.

TRADE STANLEY MARK

STANLEY UNISHEARS
THE ELECTRICALLY DRIVEN HAND SHEARS

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on page 116.

127—Air Conditioning and Heating Equipment

Airtemp Division of Chrysler Corporation, Dayton, Ohio, is distributing two pieces of literature. One entitled "Key to Year-Round Comfort" contains 20 pages. The other of 16 pages illustrates and describes the complete line of air conditioning and heating equipment for homes and for stores, and other buildings. Both are 8½ by 11 in size.

128—Fan Catalog and Dealer Sales Manual

Wagner Electric Corporation, 6400 Plymouth Avenue, St. Louis, is distributing their 1941 Fan Catalog and Dealer Sales Manual—with sales and application data. Bulletin FU-41 is intended to be of definite help to dealers, contractors and others interested in the sale, purchase, or use of air-circulating and ventilating equipment. The 20-page booklet illustrates and describes the complete line of Wagner cooling and ventilating equipment for 1941.

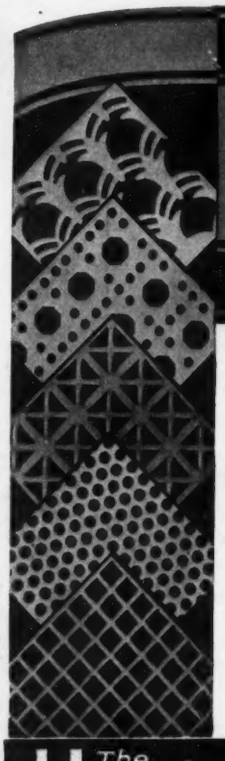
129—Gas-Vac and Vacuum Ventilation

Vacuum Gas Appliances Division of The Union Fork & Hoe Company, Rome, N. Y., is distributing a 28-page booklet (File 30-F-1) illustrating and describing Gas-Vac automatic gas heating and air conditioning with vacuum ventilation. A comparative cost table is given for coal, oil and gas.

A folder entitled "Now Everyone Can Afford Automatic Gas Heating" is also available.

130—Soldering for Workshop—Farm and Home

Soldering for Workshop, Farm and Home, by John Bonert, contains information on soft and hard soldering with projects for the workshop explained and illustrated



INDUSTRIAL
PERFORATED METALS
ORNAMENTAL

The H. & K. line offers a wide selection of ornamental and decorative grilles for public and private buildings suitable for radiator enclosures, ventilators and air conditioners. Write for Booklet No. 30.--Industrial screens for grading and separating many products -- for safety guarding and other uses. Unusual specifications carefully executed.

ANY METAL
ANY PERFORATION

The Harrington & King PERFORATING CO.

5649 Filmore St., Chicago, Ill. New York Office, 114 Liberty St.

—for beginners. Chapters cover soft soldering, description of metals, lessons in soldering, soldering and sweating with the torch, hard soldering or brazing, and shop projects. Published by Orange Judd Publishing Co., 1526 E. 26th St., New York City. Price $1.25.

◆

131—Ajax Deco-Shingles in Color

The Cincinnati Sheet Metal & Roofing Co., 230 E. Front St., Cincinnati, is offering literature and color samples of their new Deco-Shingles—open hearth, copper-bearing steel, zinc coated and finished in four colors and in two sizes: 8 x 14½ and 5½ x 18½. Shingles have ⅜ in. butt, a combined side lock and spacing groove, are held by two concealed nails in each shingle. Each shingle locks on all four sides.

◆

132—1941 Catalog

The Black & Decker Mfg. Co., Towson, Md., is offering a new 60-page 1941 catalog illustrating their complete line of 132 portable electric tools.

The new ¼-in. standard ball bearing drill, designed primarily for aircraft work, is illustrated on page 4, and on page 44 will be found the new No. 95 Vackar, a super-powered vacuum cleaner.

◆

133—Industrial Tool Catalog No. 50

Stanley Tools, Division of The Stanley Works, New Britain, Conn., is distributing a new Stanley Tool catalog for Industry, prepared in an easy-to-read and easy-to-order manner. There are 56 pages of selected tools known to be in demand by production men.

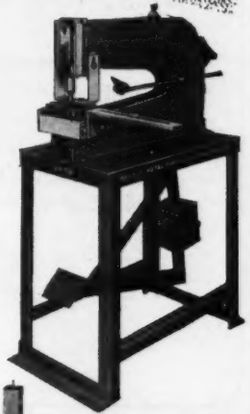
An alphabetical index is printed on the cover for quickly locating the various classifications of items. A more detailed index is included inside the book.

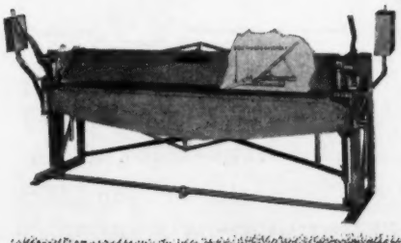
The catalog measures 8½ x 10⅝ inches and is punched for a Kalamazoo binder.

BUY WHITNEY-JENSEN
METAL-WORKING MACHINERY AND HAND TOOLS
FOR LONG LIFE and ACCURACY

SAVE MONEY WITH THESE FOOT PRESSES

Low-cost, toggle-action machines, adaptable to many light production and jobbing operations requiring punching or forming. Capacity, 2" hole in 16 ga. iron, 100 holes per minute or better. Four sizes, 7", 10", 18", and 24" throat depth. Special punches or forming dies can be furnished, properly designed by our experienced engineers. Write for new Catalog No. 14.





TAKE THE ACHE OUT OF BRAKE WORK

ROLLER BEARINGS at important points make Whitney-Jensen Brakes 30% easier on the operator! HARDENED JAWS for stainless steel. Made for 12-14-16 gauge, 4-5-6-8-10 ft. sizes.

WHITNEY METAL TOOL COMPANY
[illegible] FORBES STREET • ROCKFORD, ILLINOIS

SELL EQUIPMENT THAT IS *Twice Tested*

Durability, performance, economy are *twice assured* in PAYNE gas-fired furnaces... first by AGA Blue Star approval, then by the endorsement of our own relentless "proving ground," the PAYNE Testing Laboratory. Thus, every PAYNE owner is an enthusiastic user of comfortable, economical gas heat. ☆ There is a style and size of PAYNE Furnace for every house in town. Display, recommend, *sell* PAYNEHEAT in your territory.

Write us NOW for information on our dealer plan. Your selling effort is backed by generous national advertising.

Floor Furnaces—Modern Console Heaters—Duplex Furnaces—Forced Air Units—Zoneair Units—Gravity Furnaces... a PAYNE gas appliance for any size job. ☆ Dealers—a few territories still open. Write us.

THE IDEAL FUEL GAS

PAYNEHEAT
Payne FURNACE & SUPPLY CO., INC.
BEVERLY HILLS • CALIFORNIA

It's the Regularity of Rhythm that Increases Production

● Whether the job is light seam flattening or intricate forming and flanging, Quickwork Power Hammers will invariably do it faster.

An EXCLUSIVE QUICKWORK FEATURE that increases production 25% to 50% and makes it much easier for the operator to do a better job, is the CONSTANT SPEED STROKE—secured by eliminating clutches. The number of strokes is always 1200 per minute, whether striking a light tap or a heavy blow.

The force of the blow can be varied by the operator during the operation without stopping for adjustment.

Quickwork Power Hammers are built in four sizes. All are rugged, substantial machines that will stand hard work and rough usage, and have a remarkable record for production on large and small stampings.

Shipment of standard models is possible from stock—subject to prior sale. For complete information on Quickwork Power Hammers write today to Quickwork-Whiting Division of Whiting Corporation, Harvey, Ill.

QUICKWORK POWER HAMMERS PAY FOR THEMSELVES IN THE SAVINGS THAT THEY MAKE

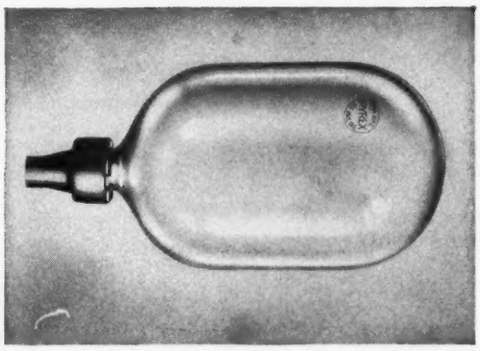
WHITING CORPORATION
HARVEY, ILLINOIS

QUICKWORK

Rotary Shears · Circle Shears · Seamers · Beaders · Power Bumping Hammers · Flangers · Stamping, Trimming and Forming Machines
Manufactured by
Quickwork-Whiting Division of Whiting Corporation, Harvey, Illinois

M-VB HAS THE ANSWER

TO FLOAT CORROSION GRIEF



AND THIS *PYREX GLASS FLOAT* IS IT!

A lot of humidifier valve troubles begin with floats that become corroded. Here's a float that *can't* corrode because it's made of *pyrex glass*. Now it makes no difference what the mineral content of the water may be—float corrosion grief is out.

These M-VB pyrex glass floats are tough customers, too. They can be submerged in boiling water and then dipped in cold water *without breaking*. They're plenty tough enough to stand any reasonable handling while being installed. Each M-VB float is checked for strength by the manufacturer—and then double-checked by M-VB on its own, special equipment. We say these floats have what it takes—and the Trade agrees.

Pyrex glass floats are an exclusive M-VB "scoop". You'll find 'em on *all* M-VB humidifier valves—and without premium to pay. Get in touch with your manufacturer or M-VB today . . . and be free of the float corrosion problem for good.

M-VB **MORENCY-VAN BUREN DIVISION**
SCOVILL MANUFACTURING CO.
Sturgis, Michigan

SCOVILL SAVES YOU TIME IN SELLING—TIME IN INSTALLING

Complete lines of humidifier valves maintained at Waterville, Connecticut—San Francisco and Los Angeles, California

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on page 116.

134—Sheet Metal Shop Machines and Tools

Niagara Machine & Tool Works, Buffalo, N. Y., is distributing a 24-page booklet illustrating and describing machines and tools essential to sheet metal shops, with specifications for each machine.

◆

135—Deep Drawing, Shearing, Perforating

The International Nickel Company, Inc., 67 Wall Street, New York City, is distributing Technical Information Bulletin T-19 on monel, nickel and nickel alloys—deep drawing, shearing and perforating.

◆

136—Kooler-Aire Program

United States Air Conditioning Corporation, Northwestern Terminal, Minneapolis, is distributing a broadside broadcasting their comfort cooling program for 1941. Illustrated and described are the Kooler-aire evaporative cooling system, USAIRCO adjustable deflecto grille, blower, giant water assembly, Gyra spray, and Kold-Aire economy unit.

◆

137—Comfort Ventilating Fans

The Lau Blower Co., 2001 Home Avenue, Dayton, Ohio, is distributing two catalog pages, dealer manual, envelope stuffer, and price sheet on their line of comfort ventilating fans.

Newspaper advertising mats, suggested direct mail letters for dealer use, and a model demonstration house with fan and motor are also available.

◆

138—Emerson Welder Catalog X-3896

The Emerson Electric Mfg. Company, St. Louis, offers an 8-page A.C. arc welder catalog fully illustrating and describing the new line of A.C. Arc Welders.

Detail construction features, performance, specifications, and prices are given for all four models. Range of uses for each size, approximate operating costs, tests given to all welders, and a description of accessories furnished are also included.

◆

139—Fabrication of Stainless Steels

Allegheny Ludlum Steel Corporation, Pittsburgh, Pa., has published and is distributing a 28-page, 8½ x 11 in. booklet entitled "Fabrication of Allegheny Stainless Steels" prepared from carefully checked laboratory and service tests and so certified by V. L. Browne, Vice President and Technical Director.

Contents include welding, drawing and blanking, machining, spinning, upsetting and forging, riveting, shearing, soldering and brazing, annealing and heat treatment, grinding, polishing and buffing, and surface treatment.

◆

140—Facts on Low-Cost Heating

Perfection Stove Company, 7609 Platt Avenue, Cleveland, has issued a combined catalog and case history booklet entitled "Superfex Book of Facts on Low Cost Heating," and describing Superfex oil-burning and gas-burning air conditioning furnaces.

The cost of one or more winter's heating of specific homes, of which floor plans are given, together with supporting evidence, such as actual fuel bills or statements by owners or suppliers of fuel, includes named homes in many states, from Iowa and Minnesota to the Atlantic seaboard. Each such case history occupies an 8½ by 11 inch page in the 48-page booklet.

Two complete lines of 3-stage furnaces are catalogued, including a three-option oil burning furnace designed especially for low-cost homes, which is available either as a complete air conditioning furnace or as a manually controlled gravity-type furnace, which later can be expanded to either an automatic gravity-type system or a complete air conditioning furnace.

A MONEY MAKER FOR YOU!

★ "PACIFIC" A-80 is a furnace that will warm your heart . . . fatten the old bank account and make your customers happy for evermore! It's built in two *easily handled* sections. Interchangeable casing panels and reversible blower permit quick and easy transposition of Heating and Blower Units, in the shop or on the spot. Simply bolt them together when you've decided on the best arrangement. It saves you effort . . . saves you time . . . saves you money. And your customer gets a gas-heating and ventilating unit of utmost efficiency, low cost operation, long reliable service and *lower initial cost* than the same elements in a single cabinet.

★ Give your business a lift with this 1941 money-maker...the *"Pacific" A-80.*

Write Dept. AA-3.
PACIFIC GAS RADIATOR CO.
Huntington Park, Calif.

"Pacific" Round Heating Element, an innovation in gas furnace design. Recovers a higher percentage of heat units to input than any other heating element. Rigid, durable, welded gas-tight, leakproof.

"Pacific" Multi-Tubular Burner produces maximum flame temperature . . more heat at less cost. No adjustments required. Heavy cast-iron fire-box liner above protects side walls of element.

Mueller Prefabricated Duct Takeoff Sheet
..here's how you SAVE
—by using facts instead of guesswork
MUELLER ENGINEERING MANUAL
MUELLER ENGINEERING MANUAL
SECTION H FORCED AIR HEATING

..when you install MUELLER "PRE-FAB" Duct Systems

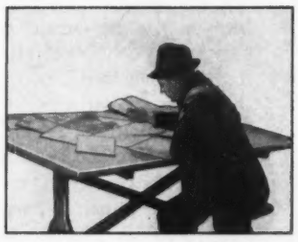
You save your profit—because you *know in advance* your net costs for material. You order only what is on the take-off sheet — with no "extras" afterwards to inflate your costs.

You save time—because "made-up" fittings permit quicker assembly on the job and free you from laborious balancing after installation.

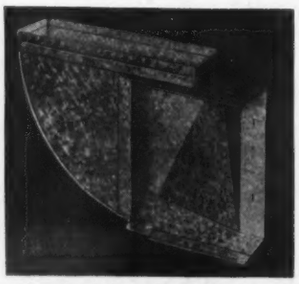
You save money with a lower finished cost, because Mueller systems are easily installed and require less material.

★ ★ ★

Mueller "E. L." (Equivalent Length) figures give you exact air resistances, proportioned air deliveries simplify final balancing — assuring your customer's satisfaction. Use Mueller "Pre-Fab." Ask your jobber or write *L. J. Mueller Furnace Company, 2010 W. Oklahoma Ave., Milwaukee, Wis.* for catalog and engineering manual. D-14



● **Save headaches** with Mueller's handy Engineering Manuals and work sheets. Factory layout service available.



● **Save 2 inches at each side branch take-off** with Mueller's patented take-off fittings. May be installed within standard joist spaces. Get smaller, neater trunk lines, requiring less material.

MUELLER Milwaukee

GRAVITY AND FORCED AIR FURNACE PIPE AND FITTINGS

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on this page.

141—Weld Recorder

General Electric Company, 1 River Road, Schenectady, N. Y., is distributing Bulletin GEA-3312A, entitled "Weld Recorder for Better Spot-Welded Structures." The instrument records the character of the electric input for every weld, as compared with present allowable limits; signals audibly, and locks out the welder when the input varies more than the present allowable limits for satisfactory welds; and prevents subsequent welding until a push button is pressed.

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.
Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

27	28	29	30	31	32	33
34	35	36	37	38	39	40
41	42	43	44			
117	118	119	120	121	122	123
124	125	126	127	128	129	130
131	132	133	134	135	136	137
138	139	140	141			

Name .....
Company .....
Address .....

Are you Manufacturer——Jobber——Dealer——

With The Manufacturers . .

Burt Modernizes Plant

The Burt Manufacturing Company has awarded contracts for the design and construction of a $50,000 addition to its existing facilities at South High and South Streets, Akron, to The Austin Company, engineers and builders. The present plant is to be modernized and revamped.

The addition, which will be of structural steel and brick, is needed to handle an increased demand for ventilators of various types, according to C. A. Palmer, president. Continuous sash will enclose the plant.

About 18,000 square feet of floor space will be provided in the building, which will be of the monitor type and will have one of the company's own "monovents" or heat valves in the ridge of the monitor.

◆

Elgo Shutter Moves to New Plant

The Elgo Shutter and Manufacturing Company, Detroit, has recently acquired and moved into a new plant at 6970 W. Jefferson Avenue, with four times as much floor space as the plant previously occupied.

Elgo manufactures a wide range of ventilating specialties such as automatic, stationary, hand-operated and motorized shutters, and ceiling, balanced and back draft dampers. The new plant is already worked to capacity.

1941's HOTTEST LINE!

Conco

Again Conco scores with a complete new gas-fired line — airconditioners, gravity furnaces, floor and wall heaters. The new, powerful airconditioner at right comes in five sizes — in two models — to sell to any size home. Its companion unit — a beautifully engineered gravity furnace — is also available in a complete range of sizes. Write today and get the facts on Conco's new 1941 line of coal, oil and gas-fired equipment.

Conco Oil-Fired Airconditioners

Conco Conversion Oil Burners

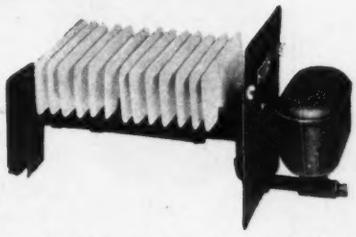
Conco Clipper — Low Cost Stoker

DIVISION H. D. Conkey AND COMPANY

CONCO CORPORATION
70 EUCLID AVE. MENDOTA, ILLINOIS

LOOK WHAT SKUTTLE OFFERS YOU!

700 SQUARE INCHES OF EVAPORATING AREA



FOR *Only* $14.75 LIST F.O.B. Detroit

AGAIN YOU GET MORE WITH SKUTTLE

Again Skuttle leads the field by offering you more evaporating area for less money! This Skuttle Series 300 humidifier complete with the new all glass Vapoglas evaporating plates gives you more evaporating area per dollar. Let us send you a sample unit today. All orders shipped same day they are received.

READ THESE EXCLUSIVE FEATURES

The new Skuttle Series 300 Automatic Humidifier with the improved adjustable rear support and anti-syphon valve is finished in attractive black wrinkle with black vitreous enamel evaporating pan. Illustration shows unit with a set of VAPOGLAS evaporating plates. Sizes available in 18", 20", 24" and 30" evaporating pans. The number of VAPOGLAS plates recommended for the above sizes are 18"—14 plates, 20"—15 plates, 24"—18 plates and 30"—22 plates. In each evaporating pan there is provision for an increase of 125% in evaporating area by adding additional VAPOGLAS plates over the number recommended.

SKUTTLE *Sales* COMPANY

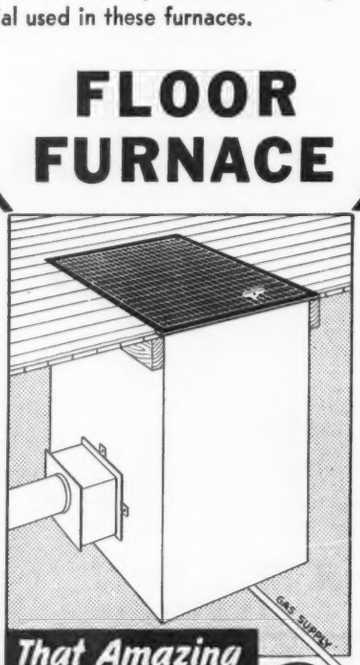
Air-Conditioning Equipment

999 FRANKLIN ST. • • • DETROIT, MICHIGAN

JOHN ZINK

These Floor Furnaces are pressed and cut-out by special dies, designed and made by our own engineers, in our own shop to cut out exactly the heavy material used in these furnaces.

FLOOR FURNACE



That Amazing JOHN ZINK FLOOR FURNACE

JOHN ZINK BURNERS

Made in three popular sizes. These furnaces feature a larger, improved combustion chamber and a One-port Non-plugging Gas Burner.

•

Of course John Zink Burners and Floor Furnaces are approved for government jobs.

John Zink Low Pressure Burners

for

DOMESTIC FURNACES
HEATING BOILERS POWER BOILERS
GASOLINE PLANT BOILERS

•

Aggressive Dealers Write for Details

•

John Zink Company

4401 S. Peoria Ave.
Tulsa, Okla.

342 Madison Ave.
New York City

7309 E. End
Chicago, Ill.

2405 S. Harwood
Dallas, Texas

With the Manufacturers . .

Osborn Officers and Directors

At the annual meeting of The J. M. & L. A. Osborn Co., held Thursday, January 23, at the company's general offices in Cleveland, the following directors were re-elected: A. W. Howe, C. A. Nenno, J. W. Harrison, J. T. Hagan, C. E. Caddy, W. B. Osborn and G. F. Climo.

Elected to serve as officers for the ensuing year were: A. H. Howe, president; C. A. Nenno, executive vice president; J. W. Harrison, secretary, and G. F. Climo, treasurer.

◆

Byers to Produce Alloys

The 76-year-old A. M. Byers Company, Pittsburgh, manufacturers of wrought iron, will soon enlarge its activities to include the production of a line of alloy steels, including stainless.

The announcement was made by L. F. Rains, president, following action of the Board of Directors.

Production will begin within four to six months. An addition will be built to the company's Ambridge plant, and will be used as a melt shop for new electric furnace equipment.

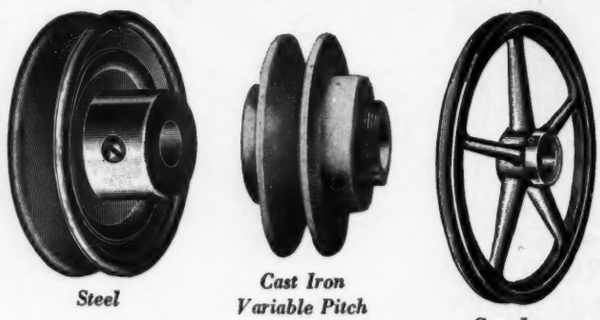
◆

Rainbault Manager G-E Air Conditioning

John P. Rainbault has been named manager of the air conditioning and commercial refrigeration department of the General Electric Company it was announced by H. L. Andrews, vice-president.

Formerly manager of the company's electric clock section in Bridgeport, Conn., Mr. Rainbault succeeds Stuart M. Crocker, who was recently named a vice-president concerned with customer relations. Mr. Rainbault's headquarters will be in Bloomfield, N. J.

Those Who MUST Have
DEPENDABLE PERFORMANCE
Choose **MAUREY V-PULLEYS**



Steel | *Cast Iron Variable Pitch* | *Cast Iron*

Heating and Air Conditioning Plants, Refrigeration Units, Fans, Blowers, Stokers and similar installations MUST have dependable V-Pulleys for F. H. P. Transmission.

Manufacturers of apparatus of this kind have found that Maurey V-Pulleys installed in their units assure unfailing dependability that can be guaranteed against "break-down" caused by pulley failure.

When considering V-Pulley requirements, be sure to compare Maurey V-Pulleys with any other V-Pulleys made, for Design, Workmanship, Appearance and Performance.

Write for Circulars Describing Maurey Steel, Cast Iron, and Variable Pitch Diameter V-Pulleys.

MAUREY MANUFACTURING CORP.
Wabash at 29th Street, Chicago, Illinois

With the Manufacturers . . .

Reining Is Chicago Cook Representative

Cook Electric Company, 2700 Southport Avenue, Chicago, announces the appointment of Lou Reining as its heat control sales representative for the Chicago area. Mr. Reining has become well known among warm air heating contractors in this area as the district representative for Thermo-Drip humidifiers, in which capacity he will continue as heretofore.

◆

Osborn Names Indiana Representative

The J. M. & L. A. Osborn Company, 1541 E. 38th St., Cleveland, sheet metal jobbers, announces the appointment of Edward A. Rosswurm as their representative in the Indiana territory formerly served by the late C. M. Coffee.

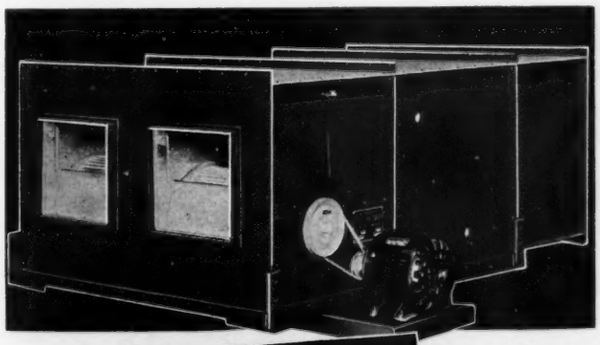
Mr. Rosswurm, having spent more than eighteen years in working with the Indiana trade, will need no introduction to many of the sheet metal men.

◆

General Controls Opens Philadelphia Branch

General Controls Co., Glendale, Calif., announces the opening of a new factory branch office at 4515 North Broad St., Philadelphia, with complete stocks of motorized and solenoid valves and other automatic controls for industrial application, gas and oil heating and for refrigeration.

In charge of the new office will be George Le Fevre, for the past 3 years sales engineer in the company's New York City branch.



CLARAGE

Designed to control temperature and humidity within close limits. Can be made completely automatic in operation, regulated by room thermostat and humidistat.

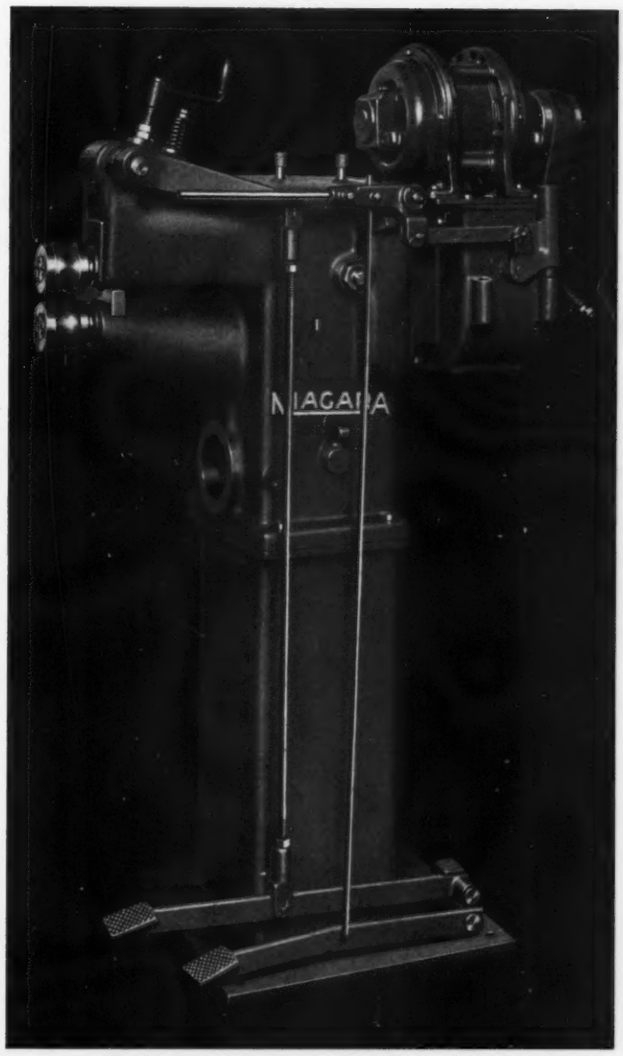
Multitherm Units

✓ Cooling
✓ Heating
✓ Complete Conditioning

Finest type of equipment available for small summer cooling, winter heating or complete year-round air-conditioning jobs. Widely used in factories, offices, stores, etc. Highly efficient; remarkably compact; easily installed in any idle space.

Write for Bulletin 107 describing various arrangements and giving capacity ratings.

CLARAGE FAN COMPANY
872 PORTER STREET · KALAMAZOO, MICH.
Sales Engineering Offices in all Principal Cities



Heavy, powerful and productive, this power driven Niagara Combination Machine enables the up-to-date sheet metal worker to meet the ever increasing heavy gage jobs. Interchangeable rolls make one machine capable of Burring, Turning, Wiring, Beading, Crimping, Flanging, Slitting and Circle Cutting. Beading and Crimping can be done in one operation. Foot control of clutch and upper roll allow the use of both hands to hold and guide the work.

Gear box contains intermediate gears and clutch, all running in oil. Pulley shaft runs on ball bearings. Intermediate shaft bronze bushed. Rolls keyed to shaft ends and held in place with collar screws flush with ends of rolls. Work feeds from left to right. Drive pulley furnished with machine gives best operating speed. Special pulleys can be furnished for unusual speeds.

Specially designed clutch gives instant hand or foot control. Can be locked for continuous operation.

Upper shaft raised and lowered by foot treadle or crankscrew. Latter clears work in any position. Can be used as stop limit when using foot treadle. Lateral adjustment of upper shaft by knurled screws, moves rocking box; therefore, does not disturb upper shaft bearings.

Write for Bulletin 75-A. Niagara Machine & Tool Works, General Offices and Factory, 637-697 Northland Ave., Buffalo, N. Y. Branches: New York, Cleveland, Detroit.

DOLLARS OR DIMES... WHAT DO YOU WANT?

Cole's Gas Fired Floor Furnaces Are the Quick-Selling Answer to Scores of Heating Questions

Selling Cole's Gas Fired Floor Furnaces pays big dividends in dollars and in customer satisfaction. In new homes for the finest in low cost automatic heat, sell Cole . . . for old homes, replacement jobs or for auxiliary equipment, sell Cole. NOW is the time to talk Cole's Gas Fired Floor Furnaces and NOW is the time for you to cash in on the demand for economical, trouble-free, dependable heat.

Cole Gas Fired Floor Furnaces are approved by the AGA. A full vitreous porcelain enamel inner heating unit assures the most in durability and efficiency.

Other features include large heating surface and long delayed flue travel for maximum heat from any gas; unit crimped and sealed by a patented process for gas tight and stay tight construction; three walled casing of galvanized steel or full porcelain casing at small extra cost.

Combination safety pilot and automatic thermostatic control also available.

Write for full details today!

AMERICAN GAS ASSOCIATION · APPROVED · COMPLIES WITH NATIONAL SAFETY REQUIREMENTS

COLE HOT BLAST MFG. CO.

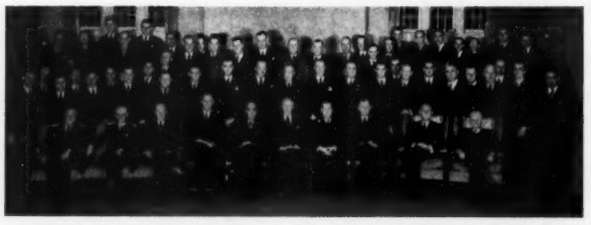
3108-26 WEST 51st STREET • CHICAGO, ILL.

With the Manufacturers . . .

International General Sales Convention

International Heater Company, Utica, N. Y., held a two-day general sales convention on January 20 and 21. The sales policy for 1941 was discussed and new products presented.

At the banquet on Monday evening, Irving L. Jones,



president, was presented with a traveling bag in honor of his 45th year with International. Mr. Jones has been very active in associations pertaining to the heating industry. He is a two-time president of the National Warm Air Heating and Air Conditioning Association, having served in the years 1921 and 1923 and also in the years 1931 and 32.

Arthur C. Allshul Retires

Arthur C. Allshul, manager of the Philadelphia plant of Joseph T. Ryerson & Son, Inc., retired on February 1st after 42 years of continuous service with the company.

Mr. Allshul began as a very young man at the Chicago plant in 1899. After a successful career in the Chicago sales department, he became Ryerson district sales manager at Milwaukee. In 1919, upon the acquisition of the Ferguson Steel and Iron Corp. of Buffalo, Mr.

THE PATENTED FIELD BAROMETRIC Draft Control

BALANCED AT FACTORY

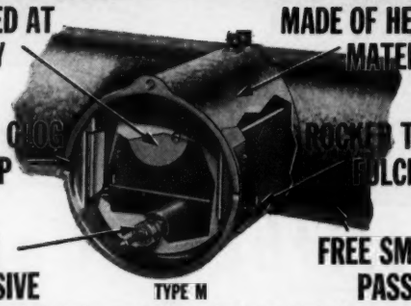
MADE OF HEAVY MATERIAL

DOESN'T CLOG OR WARP

ROCKER TYPE FULCRUM

QUICKLY RESPONSIVE

FREE SMOKE PASSAGE



TYPE M

The most efficient draft control ever designed for constant use, year after year. Easily installed—no servicing. In a full range of sizes. Write for details.

TWO MORE OUTSTANDING FIELD CONTROLS

6" TYPE "U"

The Field Control line is complete with the 6" Type "U" control for coal and oil-burning heaters and the motorized Type "M" Control in sizes up to 20". Also a complete line of commercial Controls. Write for literature.

MOTORIZED

FIELD CONTROL DIVISION MENDOTA, ILLINOIS

Allshul took charge as manager. He remained at Buffalo until 1929 when he was appointed manager of the Ryerson Philadelphia plant.

Mr. Allshul has the distinction of having the longest continuous service record of anyone now in the Ryerson organization.

◆

Peerless Expands Plant

The Peerless Foundry Company of Indianapolis, Indiana, has just completed a new addition to their plant, 50 x 80 feet, two floors, into which they will move their shell division.

◆

Alleghany-Ludlum on Pacific Coast

W. F. Detwiler, chairman of the board of Allegheny Ludlum Steel Corporation announces the completion and opening of the company's new, modern warehouse and offices at 4915 Pacific Boulevard, Los Angeles—designed to give complete and prompt service to the corporation's many customers for special steels on the West Coast.

◆

Westinghouse Dealer Meetings

H. F. Hildreth, sales manager of the Home Heating and Packaged Air Conditioning Division of Westinghouse Electric and Manufacturing Company at East Springfield, Massachusetts, and William R. Mason, advertising manager of the Air Conditioning Division, are conducting a series of twenty dealer meetings throughout the country.

They give a splendid presentation of the packaged air conditioning line consisting of cooling units ranging from one to 25 tons which can be sold and installed by the heating contractor handling their line of home heating.

Their home heating line consists of all items from a plain gravity furnace to a complete winter air conditioning furnace, which of course can be combined with one of the cooling units for year round air conditioning in the home.

AUTOMATIC GAS SHUT-OFF CONTROL *THERMOCOUPLE TYPE*

GENERAL CONTROLS THERMOVALVE MR-2 AFFORDS POSITIVE SHUT-OFF FOR WATER HEATERS, FLOOR FURNACES, ETC.

Pilot flame applied to thermocouple element provides all necessary current for valve operation. Valve is of manual reset, straight-through gas type, automatically closing upon pilot flame failure. Standard thermocouple length 30". Valve sizes ⅜" to 1½"

NEW BULLETIN. Write for your copy of the new 12 page gas control bulletin just off the press. Use it as your buyer's guide.

Various types burner heads available. Provides ease for adapting thermocouple with proper relation to pilot flame.

GENERAL CONTROLS

450 E. Ohio St. Chicago, Ill. — 267 5th Avenue New York City

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

Eleven years steady growth and a 110% increase last year is the best proof we can give you that it pays to sell Gehl Stokers.

People recognize and appreciate the extra values in a Gehl. Users talk about its simplicity and fine performance . . . its ability to burn low-priced fuel without smoke, soot or odor. They know that there is extra economy in its sturdy construction, in the cast-iron chassis and coal tube that resists rust from basement dampness and fuel moisture. They know that there is extra security in the unconditional guarantee backed by the 73-year-old Gehl Company.

New Domestic Hopper-fed model in three sizes. Also bin-fed models.

NATIONALLY ADVERTISED

Gehl advertising reaches millions of home owners telling them about the advantages of a Gehl. Attractive literature and sales helps. A 3-year financing plan for new and remodeled homes. Domestic, commercial and industrial models—a size and type for every installation.

Industrial and commercial models in various sizes.

WRITE TODAY

for catalogs and particulars of our dealer plan.

GEHL BROS. MFG. CO.

Dept. A — West Bend, Wisconsin

There's A ROUND OAK

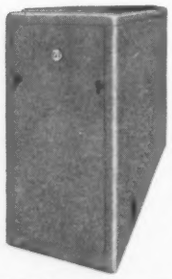
70th Anniversary Value

For Every HEATING REQUIREMENT

"J" Blended Iron Furnace a Round Oak gravity unit, famous for quality and superior features. A leader in any locality.

"SPX" Stoker Furnace with side extensions for stoker on either right or left. Complete winter air conditioning. Used with Round Oak stoker or any other standard make.

Round Oak Stoker in several sizes. Efficient, dependable, and priced to sell.



"XB" Oil Furnace performs all functions of heating and winter air conditioning. High operating efficiency; low operating costs. A complete package unit with Round Oak's oil burner.

"S" Boiler Plate steel gravity furnace of welded gas-proof construction. Available in all sizes.

TAKE advantage of every *70th Anniversary* value Round Oak has to offer, and you'll be equipped to cover the entire warm air field... to extend your sales efforts over a broader market... to hit new peaks in volume and profits. For the Round Oak line of coal-burning, oil-burning, warm air furnaces and air conditioning equipment has never before been so complete... never so easy to sell. Cash in on it! Write for dealer terms today.

ROUND OUT WITH ROUND OAK

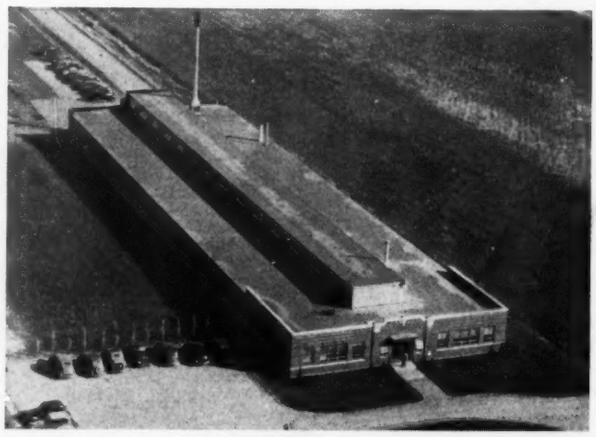
of Dowagiac, Mich.

THE COMPLETE LINE OF FURNACES
OIL BURNERS AND STOKERS

With the Manufacturers . .

New Sampsel Building

Continuous airconditioning and completely glassed side walls are features of the new 24,000 sq. ft. building recently erected for Sampsel Time Control, Inc., at Spring Valley, Illinois. The new Sampsel building is 300 ft. long by 80 ft. wide—of modern brick-tile-glass construction—and is located in the northwest limits of Spring Valley, Illinois.



The Sampsel organization consists of over 150 people engaged in manufacturing automatic controls for heating and air conditioning equipment. Production in the new plant is now running smoothly on three assembly lines, with two additional assembly lines under construction. The new building also houses an elaborate engineering laboratory where new controls are developed and tested.

Premier FURNACE CLEANER

MAKES SOOT A BUSINESS BUILDER!

Removing soot from furnaces with the Premier Furnace Cleaner is one quick way to make money — but you'll make *more* on the new business developed from leads you get in this way! It's sturdily built for years of service, yet light and easy for one man to operate. Cleans cold or under fire. Can be used without tank for suction or blowing. Write today for complete information!

NEW IMPROVED MODELS
Completely Equipped

5/8 H.P. . . . $69.50
1 H.P. . . . $89.50

Complete Chimney Cleaning Equipment Only $9.00.

ELECTRIC VACUUM CLEANER CO., INC.
1730 Ivanhoe Rd. • Cleveland, O.

George R. Atherton Joins Trane

The Trane Company, La Crosse, Wisconsin, manufacturers of heating, cooling, and air conditioning equipment, announces the appointment of George R. Atherton for executive sales work with the eighty-five Trane offices throughout the country. Mr. Atherton is widely acquainted throughout the heating and air conditioning industry.

◆

Distributors of Research Products

Research Products Corporation of Madison, Wisconsin, announces the appointment of three new distributors of Research air filters: P. J. O'Meara Company, 50 Hawthorne Street, San Francisco, is to be the representative covering the northern part of California and part of Nevada. Harrison Sales Company, 314 Ninth Avenue North, Seattle, will cover Washington, Oregon, British Columbia, and northern part of Idaho. The new sales representative for Arizona, Clark County, Nevada, and the southern part of California will be Trade-Wind Motorfans, Inc., 1325 Maple Avenue, Los Angeles, California.

◆

F. Meyer & Bro. Diamond Jubilee

F. Meyer & Bro. Co., Peoria, Illinois, is celebrating its Diamond Jubilee, with store and office in the same location since March, 1866.

In March, 1866, Frank Meyer, having learned the sheet metal worker's trade, started what then was known as a "tin shop," making all classes of pots and pans, teakettles, buckets, etc., in addition to tin roofing, spouting and sheet metal repairs. As the business grew, he added a stock of hardware and steadily very much enlarged the sheet metal shop.

In 1894 the company began to manufacture furnace pipe and since that time Handy Pipe has grown to be one of the leading brands of pipe used by the heating trade throughout the United States.

AJAX

PREFABRICATED DUCTS—FITTINGS
for Forced Air and Air Conditioning Installations

24-hour Delivery Service

Our Engineers Are At Your Service

Our Catalog "A" (Gravity Fittings), Catalog "B" (Forced Air Fittings) are yours on request.

THE CINCINNATI SHEET METAL & ROOFING CO.
Furnace Fitting Department
230 E. Front St. Cincinnati, Ohio

If you are quality-minded—here's how to get extra quality at no extra cost. Buy Ruberoid Asbestos Paper. It has ⅓ more wet strength than the average asbestos paper. You can give your customers extra values.

Ruberoid Asbestos Paper has everything! Wet strength, accurate caliper, color and finish. The color—a soft natural blue-white. The finish—smooth on one side; rough textured for adhesion on the other side.

We urge you to try Ruberoid Asbestos Paper for wrapping furnace pipes—protecting air conditioning ducts, wood partitions, lining stoves, ovens and gas ranges. Mail coupon for free 5-foot sample. Compare its wet strength, flexibility, color, finish and ease of application.

FOR WARM AIR DUCTS, CORRUGATED ASBESTOS PAPER
Sturdy because of design of corrugation. Provides needed strength to keep air cells from crushing. Flexible, fire-resistant, easy to handle, efficient.

RU-BER-OID
ASBESTOS PAPERS

AA—3

The RUBEROID Co., *Insulation Division*
500 Fifth Avenue, New York City

Send us your free 5-foot test sample of Ruberoid Asbestos Paper. We understand this places us under no obligation.

*Name*_____

*Address*_____

*City*_____ *State*_____

Since Ruberoid sells through wholesale trade only, please give jobber's name.

FREE THIS CANISTER CONTAINING *5 foot Sample*

FRONT RANK
CAST FURNACE

There are more than 350,000 Front Rank furnaces now in use . . they must be good!

Dealers tell us the features built into Front Rank equipment make their selling job easy. Consider, for example, the Front Rank Cast Furnace illustrated. It is the only furnace we know about that is engineered so that the radiator provides a secondary combustion chamber. That makes for more efficient operation. Your customers will like the leak-proof construction and extra-heavy, oversize humidifier. What they'll like especially is the popular price of Front Rank equipment.

Front Rank has built a fine reputation. You can cash in on it. Write today for our liberal dealer plan.

A Complete Line of Warm Air Heating Equipment
•Cast Iron Furnaces •Steel Furnaces •Stokers •Registers
•Winter Air Conditioning Furnaces •Blowers •Oil Burners

PROFITS TO THE FRONT WITH FRONT RANK
FRONT RANK FURNACE CO.
DIVISION OF LIBERTY FOUNDRY CO.
2500 OHIO AVE., ST. LOUIS, MO.

Ohio Convention

(*Continued from page 96*)

rolled into slab form is another very important development which undoubtedly will lead to increased production and decreased cost.

Dr. Gonser suggested that present development in clad metal is very important, particularly the developopments which lead to the practical application of very thin coatings on a strong base. Dr. Gonser pointed out that 5/1,000th to 10/1,000th of coating is today's limit, but this undoubtedly will be reduced to as thin a coating as 2/1,000th of an inch, but this may not be too important because the coating must be thick enough to stand wear. The speaker said he believed that double clad sheets were an important development and made available valuable characteristics not obtained in single clad sheets, where the single coating on a base metal tends to cause warpage under formation whereas a coating on both sides of the base sheet seem to eliminate this tendency to warp.

So far as the sheet metal industry is concerned, the developments which are bringing about tighter zinc coatings, more attractive coatings and greater durability; also developments leading to surface coatings which form better bases for painting or finishing are important. The manufacturer of very thin copper sheets obtained by depositing successive layers of copper rather than by rolling a slab down very thin is an important development and should make available greatly improved characteristics in thin copper, said Dr. Gonser.

STEP UP PRODUCTION!
MARSHALLTOWN THROATLESS SHEARS

THE *most* PROFITABLE TOOL IN THE SHOP
Cut ANY shape—ANY size sheet!

Here's just the Shear for your shop—it's a PROFITABLE, inexpensive, hand-operated tool. Does hundreds of odd shearing jobs better and faster.

Quickly CUTS ANY SHAPE in 18 gauge or lighter material.

Get special Shear Bulletin today. Gives details, of sizes from 18 gauge to one-half inch capacity.

MARSHALLTOWN MFG. COMPANY
920 E. Nevada Street Marshalltown, Iowa

Monel During Last 30 Years

Williams & Co., represented by D. Johns provided a moving picture entitled "Proof of the Pudding" prepared by International Nickel Company and portraying the expanding uses of Monel metal from 1910 to date. The picture contained views of many of the best-known kitchen installations in the nation's best known hotels, hospitals, ships, and public institutions of all kinds, fabricated and installed 15, 20, 25 and even 30 years ago are today still providing uninterrupted service. These early installations, which proved the value of Monel have been augmented by many thousands of tons of Monel today being used in practically every application where beauty, long life, resistance to abrasion and corrosion are very necessary.

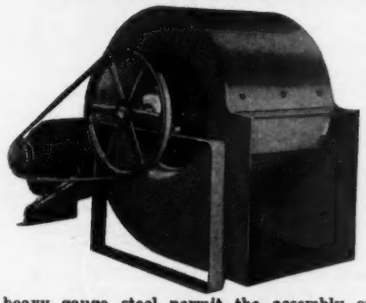
Entertainment

More than usual attention was paid to entertainment. A buffet supper with an elaborate ten-act floor show was presented by the salesmen's auxiliary on Tuesday evening. A moving picture on salesmanship photographed by General Electric Company was also shown. The annual banquet, dance and a second floor show on Wednesday evening filled the ballroom. A trip through the Ohio penitentiary was provided on Thursday morning. The Columbus Association ladies auxiliary tendered attending lady guests a theatre party, tours through department stores, a luncheon and a card party.

◆

Ray Thompson, Little Rock, Arkansas, has opened the Thompson Distributing Co. at 1701 West 3rd St. The new firm will handle Heat Wave floor furnaces, also ventilated metal awnings, attic furnaces and weather stripping.

BLOWER WHEELS, HOUSINGS, ASSEMBLIES



Fan assemblies and wheels for every forced warm air heating and air conditioning need.

The complete assembly is offered in 11 standard sizes. Top mounted motor with adjustable base or bottom mounted motor with automatic belt adjustment are available.

Bishop and Babcock Blower Wheels in ten diameters in widths from 3" up; meet any capacity demand at any operating speed.

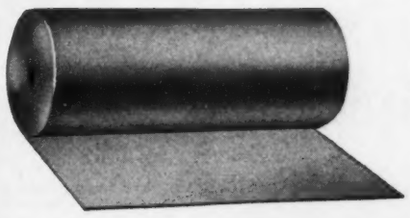
Housings constructed of heavy gauge steel permit the assembly of bearing or motor supports directly on the housing without auxiliary supports. Any width in single or double inlet design.

Write for Bulletin 87 giving full data including capacities or have Bishop and Babcock engineers submit recommendations for your requirements.

TERRITORIES AVAILABLE FOR REPRESENTATIVES

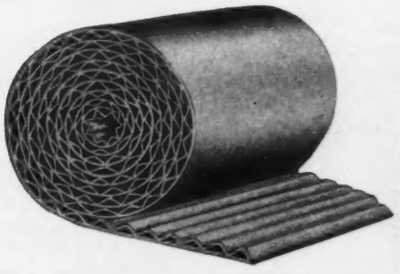
The BISHOP & BABCOCK MFG. CO.
CLEVELAND, OHIO.
REPRESENTATIVES IN PRINCIPAL CITIES

SAL-MO



SAL-MO ASBESTOS PAPER

SAL-MO AIRCELL PAPER

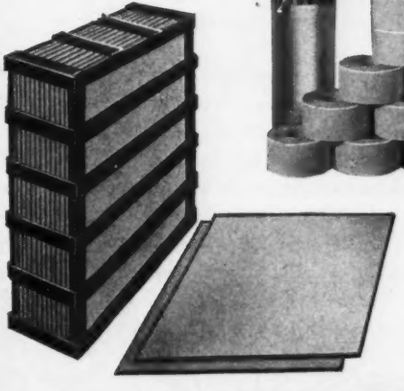


YOUR jobber *knows* the quality of all SAL-MO Asbestos Products and can quickly furnish you with the proper materials for insulation of all types of Warm Air Heating and Air Conditioning Equipment. Other well known SAL-MO products are, Furnace Cements, Flexible Asbestos Jackets for hot water tanks and Coverings for all kinds of Steam and Hot Water Pipes.

SEE YOUR NEAREST JOBBER FOR SAL-MO WARM AIR HEATING INSULATION

SALL MOUNTAIN CO.
176 W. Adams St. Chicago, Ill.

SAL-MO PIPEJOINT TAPE



SAL-MO MILL BOARD

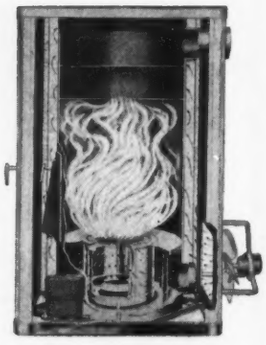
ASBESTOS

MONOGRAM

Automatic Booster Gravity Oil Burning Furnaces

featuring the

MONOGRAM "Vaporizing" Oil Burner



100% AUTOMATIC

The MONOGRAM Booster Gravity units offer you an opportunity for greater profits in 1941 and the many years to follow. Servicing and fuel costs are reduced to a minimum because of a cleaner, more efficient heating service made possible by improved methods of combustion as incorporated in the MONOGRAM "Vaporizing" Oil Burner.

This sensational new burner is the talk of the oil burner industry. By vaporizing the oil quicker, more completely, and then adding the proper balance of both primary and secondary air made possible by the patented MONOGRAM air mixing feature, it produces a clean, quiet gas flame made from oil and free from soot or carbon.

Positive tests have proven that this burner operates with a higher known efficiency than any other burner of equal size. Consequently, the MONOGRAM Booster Gravity units designed especially for gravity heating, as well as all other MONOGRAM oil furnaces, provide a more dependable, trouble-free automatic heating service that costs less to operate. Write today for our 24-page illustrated catalog which gives complete information on the entire line of MONOGRAM Automatic Oil Furnaces and apply for an exclusive MONOGRAM dealer franchise in your territory.

THE QUINCY STOVE MFG. CO.
QUINCY :-: ILLINOIS

Wisconsin Convention

(*Continued from page* 93)

emphasized the importance of overhead by pointing out that overhead is usually the difference between success and failure in the sheet metal or heating business. If the contractor recognizes the presence of overhead and properly accounts for it, success is assured, but if the contractor fails to recognize overhead and fails to apply overhead to his everyday operations, the business is very apt to lose money.

Mr. Jones explained that overhead can be determined by adding together all of the costs for the preceding six months or year which can not be applied directly against any one particular job. Such items are rent, telephone, and advertising, heat, contributions and the several dozen items not directly applicable to work under contract. These expenses added together form overhead and overhead must be apportioned to each bid in order that the contractor may recover these expenses.

Overhead, said Mr. Jones, can be applied against both material and labor, or can be applied against productive labor only. The speaker illustrated on the blackboard the result of including overhead in a selling price or forgetting to include overhead. He also explained how overhead is applied as a set percentage to either labor or material or both. Using his own business as an example, Mr. Jones declared that in 1940 labor accounted for 30 per cent, material for 40 per cent and overhead for 30 per cent of the firm's gross sheet metal and heating volume. On furnaces alone, labor accounted for 21 per cent, material 57

CODE OF ETHICS

Adopted at the 1941 Convention, Milwaukee

1. I will conduct my business in an ethical and honorable manner.
2. I will make every possible effort to render efficient, satisfactory and honest servce to my customers and to the publc generally.
3. I will comply with all Federal, State, and Local Laws governing my line of business.
4. I will render all possible assistance and cooperation to obtain the enforcement of all laws, rules and regulations and will endeavor to induce other members of the industry to abide by them.
5. I will not grant special favors nor accept bribes or rebates from any source whatsoever; nor will I divide my legitimate profit with anyone.
6. I will not reduce my price to a prospective customer in order to underbid a competitor after once having quoted a job, except for a very good reason.
7. I will never present a bid voluntarily, or upon request, if in my knowledge the job has already been let to another contractor.
8. I will do no work on any job on which another contractor has been engaged until he has been compensated for his services and has been discharged.
9. I will make an honest effort to adjust any disputes, or settle any claims to anyone in authority pertaining to any project in which I have had a part.
10. I will be as prompt as possible in meeting my obligations and make the utmost effort to maintain a clean record with my creditors.
11. I will maintain friendly relations with my employees and will not accept secret rebate.
12. I will do to my competitor as I would that he would do unto me, and at no time will I make any disparaging remarks about him.
13. I will do my utmost and will endeavor to encourage my associates and fellow members to abide by this code of ethics and thereby eliminate human selfishness.

HERE'S THE HUMIDIFIER THAT DEVELOPS SALES FOR DEALERS!

MAID-O-MIST'S No. 58-Z is the Automatic Humidifier that is recognized by the industry as the most efficient, longest lasting, and easiest to install humidifier on the market. Built especially for Winter Air Conditioning Furnaces, it sells on sight . . . for its many exclusive features definitely prove its superiority.

This is the manner in which the Patented Deflector Wings deflect the heated air over the water surface to assure maximum efficiency.

Made of sheet bronze stamped in one piece it is equipped with Patented Wing Deflectors which direct the heated air directly over the water surface so that it absorbs maximum moisture. The Water Feeder is a Maid-O'-Mist No. 59 which is approved against back syphonage by the National Plumbing Laboratory. It is equipped with Over-Saturation Control, permitting the raising of pan to reduce evaporating area in extreme cold weather. Installation is extremely simple and pan is easily removed for cleaning. Comes in two sizes, 36" and 26" lengths. Can also be supplied without deflector wings if desired.

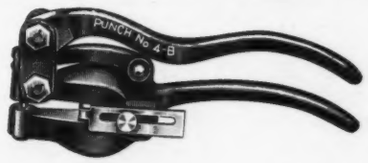
Don't Forget . . . Maid-O'-Mist manufactures humidifiers for all types of Warm Air, Steam or Vapor Heating Systems.

MAID-O'-MIST INC.

AUTOMATIC HUMIDIFIERS FOR ALL TYPES OF HEATING SYSTEMS

213 NORTH ABERDEEN STREET
CHICAGO ILLINOIS

A REAL *Time Saver*



The No. 4B PUNCH by *Whitney*

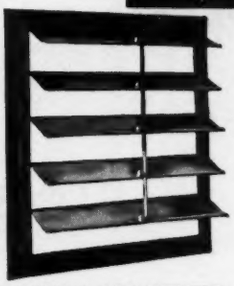
This punch is accepted by leading contractors and dealers as a real time-saver in the shop and on the job. Men who use it every day know it can't be beat for clean, fast punching. Has a capacity of ¼" through 16 ga., weight 3 pounds, 8½" in length, depth of throat, 2". Complete tool includes three punches and three dies of specified sizes with die adjusting key.

W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

Elgo's New Plant

to Meet the Ever Increasing Demand for

Elgo Ventilating Specialties



Extra Snug-Fitting Automatic Shutter

Completely weather-stripped around the inner edge of the frame, preventing the entrance of wind, rain, snow and insect pests. It's the tightest fitting shutter on the market. Exceptionally sensitive to air currents, yet entirely free from louver flutter. Has swivel joints that never get loose or rattle.

Shutters of All Kinds—Write for Catalog!

ELGO SHUTTER & MFG. CO.
6966 W. Jefferson Detroit, Mich.

Free CATALOG

FREE Follow-Up Service Closes More Than 50% of PREMIER Dealers' Prospects

This is but one of many FREE dealer helps. We're on the job all the time, aiding dealers with advertising, selling, engineering, financing. You can make more money with this *complete* line — this amazing program of dealer cooperation. Find out!

Write

for This Portfolio

PREMIER FURNACE CO.
Dowagiac, Mich.

PREMIER
- Warm Air Heating
- Air Conditioning
- Automatic Fuel Burning
- Cooling Equipment

The Year Round Line

per cent and overhead 21 per cent of the total gross volume.

The usual Wisconsin hospitality was extended to all of the 365 individuals registered for the convention. A hospitality room was open between sessions and after sessions. A card party was conducted on the first night and a combination card party and entertainment on the second night. The banquet was without speakers but included dancing and brought the convention to a close.

Quite a comprehensive display of equipment was held in one large room, also in an annex and along one side of the corridor leading to the session room. Manufacturers displayed practically every item in heating, sheet metal and equipment or tools used by the trade.

Partnership or Corporation

(*Continued from page 46*)

With our friends, Jones, Smith & Brown Company, a corporation, suppose one is injured while engaged in corporation business. The corporation has been paying the workmen's compensation premium on his salary, as part of the payroll taxes, so he is entitled to workmen's compensation while disabled.

And, for the one per cent that the corporation is paying, and the one per cent that Jones, Smith and Brown is paying, each of them may be entitled to a federal old age pension of $50 or $75 or so monthly, when he reaches age sixty-five and wants to retire. After all, to be building up something while you are earning, for the time when you can't, isn't exactly a loss.

The portion of the corporation payroll taxes that probably is a loss, is the part that is paid on Jones, Smith and Brown's salaries for unemployment insurance, perhaps amounting to three per cent of their salaries. As they indirectly own the business there isn't much likelihood of them discharging themselves, so about the only chance they have to recover any part of this expense is if the firm goes broke and they can't find a job or make a new start.

Another advantage of the corporation entity is that Jones, Smith and Brown are not personally liable for the corporation debts; while, with a partnership, all of the partners are personally liable for the firm's obligations. While this may not mean so much to the person who has all his property in the business, the partnership liability may be a decided disadvantage to a party having holdings outside of the business and which he would not wish to liquidate to satisfy the firm's creditors if the partnership became insolvent.

So each businessman must decide for himself whether he most desires the economy of the unincorporated business, or the expense and benefits of the corporation.

For Alert Dealers—
Bigger Profits
Faster Sales
Customer Satisfaction
—AUTOCRAT Oil Heat

Thrifty Convenient Healthful
AUTOCRAT
Balanced Flame OIL HEAT

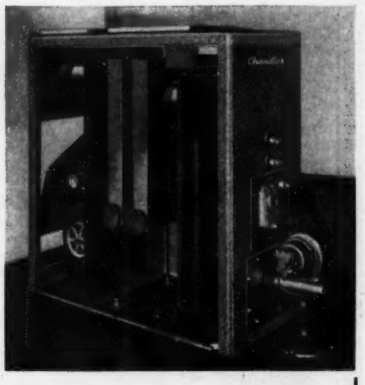
Complete with Autocrat Balanced Flame pressure burner. One-piece chassis. Extra large heating surface. Automatic humidifier. Quiet 4-speed blower. Filters. Preheating Economizer.

IT'S new . . . the Chandler "90" Oil Fired Winter Air Conditioner . . . the high-efficiency, low priced unit you need to boost sales. You can sell the "90" at a surprisingly low price and still make a good profit.

Specially built, engineered and styled for your biggest market—the 5 or 6 room home. 90,000 B.T.U. capacity (at the register) makes the "90" eligible for *three out of four jobs!* Sell it . . . install it and you can guarantee its performance.

The new Chandler "90" is compact—easy to install—easily serviced. Packed with advanced features that mean better heating, lower fuel costs, longer service and highly pleased customers.

Sell winter health-protection—greater comfort—modern furnace beauty. Cash-in with the money-saving Chandler "90". Write or wire today for Free Catalog A.



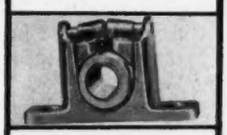
CHANDLER COMPANY CEDAR RAPIDS, IOWA

QUALITY-BUILT QUIET-AIR BLOWERS

COMPETITIVELY PRICED . . . SOLD DIRECT
TO MAKE YOU MONEY

★ Delivers more air per revolution than any other blower of its size.
★ Patented motor mount automatically maintains proper belt tension.
★ Extra heavy construction for long life. No chatter. No vibration.
★ Exclusive fan design for greater capacity. QUIETER, almost noiseless.

PATENTED BEARINGS
GUARANTEED
FOR FIVE YEARS



Self-aligning — self-lubricating. Require no attention. No rubber to deteriorate.

Here's the blower you've been hoping for! Quality-built, yet competitively priced and sold direct from factory to you. *Gives you extra profit.* Get the facts on QUIET-AIR—full proof that it's a new profit opportunity for you!

MAPLE CITY STAMPING CO.
PEORIA, ILLINOIS

THERMO-DRIP *Automatic* HUMIDIFIER

OPERATES IN UNISON WITH THE HEAT OUTPUT OF THE FURNACE

BONNET temperatures up or down, the THERMO-DRIP varies the water feed to the vapor pan precisely according to the heat output of the furnace . . . *automatically!* Thus, vaporization is kept tuned to indoor temperatures for better health, greater comfort—and for increased customer satisfaction with furnace heating. Push THERMO-DRIP. Selling *controlled humidity* is easier than selling "just humidity," especially when it costs no more.

Ask Your Wholesaler or Write Us
For Complete Details

AUTOMATIC HUMIDIFIER CO.
18th and Main Streets — CEDAR FALLS, IOWA

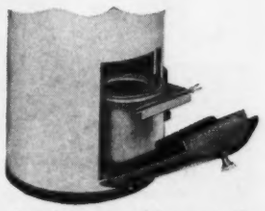
NEW LOW PRICE on this VIKING "SPECIAL"—*a sales sizzler!*

20 Gal. Capacity

Completely Automatic Oil Burning Water Heater

Truly a sensational value! A quality-built water heater that basically duplicates the famous Viking unit of which thousands have been sold for housing projects and are operating successfully. Look at the specifications. Consider the low price. Look at Viking's big success story. It has everything you need to get more water heater sales and profits. Start *now* with Viking.

Write for FREE Folders!



Quicky-removable shelf-mounted Breese vaporizing burner, approved for fuel oil. A-P control valve and thermostat. Brilliant baked enamel finish applied directly to tank.

Viking also offers a low-priced, quality line of oil-burning air-conditioning furnaces up to 100,000 B.T.U. Fast-selling units — thousands in use. Write today.

VIKING MFG. CORPORATION
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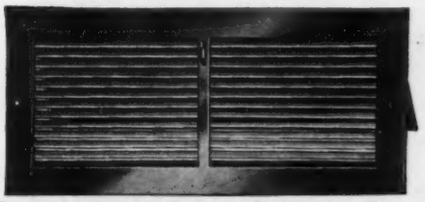
NEW AIR CONDITIONING REGISTERS

The New Rock Island line of Air Conditioning Registers now shown in complete new catalogue just off the press.



No. 822 Wall Register---Horizontal Vanes

The New Rock Island Air-Vane Registers are of bar type fabricated construction—Attractive Appearance—Rigid Construction—Vertical or Horizontal Vanes—Simple, secure adjustment.

Dealers Net Estimating Book, a time and money saver, gives full particulars, prices, etc.

Mail Coupon Today

ROCK ISLAND REGISTER CO.
Rock Island, Ill.

Gentlemen:
Please mail me a copy of your dealer's net estimating book.

Name .....

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SPRING PROFITS . .

are easy to get when you go after them constantly and with the right items. The Mt. Vernon "Vernois" Gravity Furnace will help you start your spring selling season off with a bang, and enable you to get a *real* share of new and replacement heating business. Gravity jobs allow plenty of margin for profit and when the unit you install is a "Vernois" you can be sure of top performance all the way. Literature is available.

QUALITY
EFFICIENCY
CORRECT PRICE

•

Write Today

Mt. Vernon Furnace & Mfg. Co.

MT. VERNON, ILLINOIS

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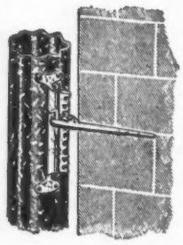
SHANKS and CIRCLES



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The only really complete line of hooks and hangers. Send for complete descriptive literature.

Sold Through Leading Jobbers Everywhere

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Indiana Convention

(*Continued from page 87*)

or prefabricated buildings which can be covered by the sheet metal contractor with corrugated or galvanized or special formed sheets. The speaker also suggested modern machinery as a means for bringing into the shop work which formerly has been done by stamping or in special shops. Mr. Carter pointed out that one bottleneck in the present boom period may be a lack of adequately trained mechanics and suggested that contractors should train their sons in the business and encourage them to become interested in the business.

A discussion of ventilation was presented by George Joslin, sales manager for Tanner & Company and Paul R. Jordan. Mr. Joslin pointed out that fresh air in motion is an excellent cooling method, not as expensive as cooling by refrigeration, but quite satisfactory for a very large number of commercial and industrial establishments. The bottleneck to sales of ventilation has been the contractor who has been reluctant to tackle commercial or industrial ventilation because he feels he does not understand fully just what is necessary to design a satisfactory installation.

The electrical trade, said Mr. Joslin, has not been so reluctant even though the electric contractor knows nothing about air movement. Equipment is now available, pointed out the speaker, for practically any application no matter how severe the conditions may be. Complete engineering and installation information is available from manufacturers, jobbers, engineers.

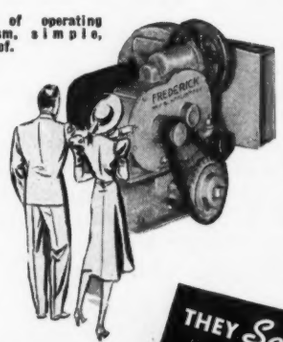
Continuing the discussion on ventilation, Mr. Jor-

nearly EFFORTLESS SELLING on this PROFIT LINE—

FREDERICK STOKERS

have these points in your favor:

Design of operating mechanism, simple, fool-proof.



1—**A quality line** with every feature for comfort and convenience and economy! Competition met or excelled!

2—**A complete line**—bituminous and anthracite—hopper and bin feed. A model for every prospect!

3—**Volume priced.** More prospects for you!

4—**Mechanically simple** — an EXTRA SALES-CLINCHING ARGUMENT that gives you the edge on competition!

Details of Liberal Dealers Proposition on some good territory still open—yours for the asking.

The FREDERICK IRON & STEEL CO.
Eighth St., Frederick, Md. • Builders of Good Stokers for 23 Years

dan pointed out that ventilation is much talked about but only lately has been seriously considered as an activity of the sheet metal contractor.

Kitchen ventilation in houses and apartments was also cited as a very good field for the sale of small ventilating equipment, either with or without duct systems. Mr. Jordan declared that the insulation of top floor ceilings is now an accepted practice, but this application of insulation has brought into being another problem, namely, how to get rid of the heat that accumulates in the attic. Ventilation is the practical solution to this problem and every attic which is insulated should also be ventilated. This ventilation serves a second purpose in that it eliminates the problem of moisture condensation in insulated attics in the heating season.

"Roll-Out" Pattern Method

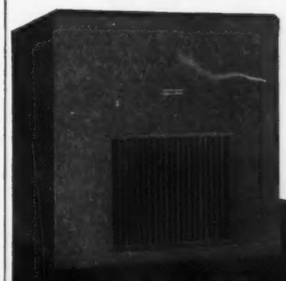
Ralph Poe of Canton, Illinois, demonstrated his rollout pattern method with small scale models of many common fittings which must be laid out in pattern before the metal is cut. Mr. Poe also announced that this method is now available to contractors in a booklet which has been printed and which is sold at 30 cents per copy by American Rolling Mill Company.

A refreshment room was maintained during out-of-session periods stocked by subscriptions from many of the firms in the industry. Also, a banquet with entertainment and dancing was presented at the conclusion of the convention.

The Furmets, the salesmen's auxilliary organization to the Indiana contractors also held their annual meeting and election of officers. The salesmen had much to do with the success of the convention and

FOR SUMMER PROFITS

Sell Comfort Cooling



EVAPORATIVE COOLING, LOWEST IN ALL COSTS, IS SWEEPING THE COUNTRY

Kooler-aire PACKAGE UNITS

CAPACITIES 2500 to 10,000 C.F.M.

COOL, CLEAN, WASH, FILTER AIR IN STORES, TAVERNS, SHOPS, BEAUTY PARLORS, OFFICES, HOMES

You can make money bringing Kooler-aire comfort cooling to the average business and home. Kooler-aire is low cost cooling. Easy to install, inexpensive to operate. Delivers big value. Write for complete details. USAIRCO shows you how to sell and install comfort cooling. Complete merchandising helps.

Write for special data on wheels, housings and light duty assemblies.

USAIRCO Air Conditioning Equipment

UNITED STATES AIR CONDITIONING CORP.
NORTHWEST TERMINAL
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A Real SHOCK ABSORBING PILLOW BLOCK
(Patent Pending)

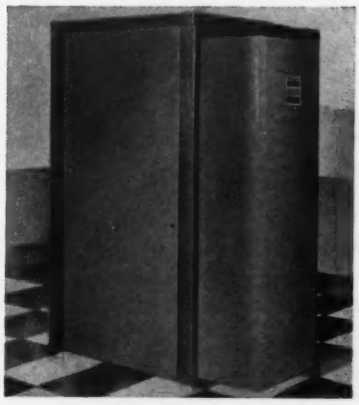
New Type Silent Bearing for Blower Service

Unique engineering encloses bushing, cushion and oil reservoir in pressed steel ball, making compact unit streamlined to present minimum of air restriction. Built-in, oil-proof, synthetic rubber cushion absorbs vibration. Porous bronze bushing, wick-fed from large oil chamber insures lubrication for exceptionally long periods of operation. Positively self-aligning due to ball and socket action of spherical housing and mounting.

Results! Low cost, increased air delivery, utmost durability and freedom from vibration. Quotations submitted on request.

TRIANGLE MFG. CO., 395 Division St., Oshkosh, Wis.

SUN FUEL MASTER



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J. V. PATTEN COMPANY
200 DeKalb Ave. Sycamore, Ill.

Repair Parts
FOR ALL HEATING UNITS
BRAUER
STOVE FURNACE BOILER
REPAIR PARTS
OIL STOVE RANGE
A. G. BRAUER SUPPLY CO.
Distributors of All Heating and Air Conditioning Equipment
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GET INTO THE BASEMENT and SELL MORE FURNACES and REPAIRS
with Breuer's Ball Bearing
TORNADO
FURNACE & BOILER
VACUUM CLEANERS
5 NEW MODELS
NEW LOW PRICES
Other dealers are getting more business with the TORNADO—you can, too. Our FREE SALES PLAN tells you how. Write for it TODAY.
Free Trial
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BREUER ELECTRIC MFG. CO.
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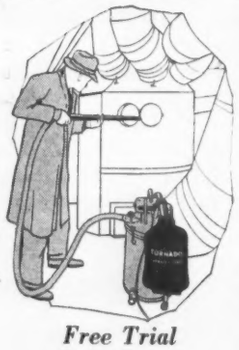

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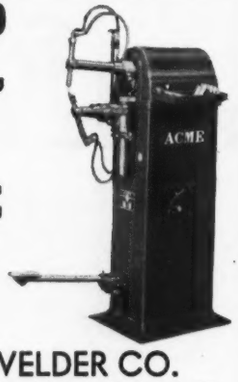
WITH AN
ACME "Hot Spot" WELDER
Proven utility for over 25 years in thousands of sheet metal fabricating plants.
Write for Literature and Prices.
Complete Range of Sizes
Lifetime Guarantee!
ACME ELECTRIC WELDER CO.
5619 Pacific Blvd. Huntington Park, Calif.



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● CHROME FINISHED COPPER
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Write us regarding your problems of designing and trim on interior and exterior finishes.
APOLLO METAL WORKS
6653 S. Oak Park Chicago, Ill.

are to be congratulated. The Furmets pledged their cooperation during the coming year for the purpose of making the 1942 convention even better.

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Technical Code—Precalculated

(*Continued from page* 59)

joist spaces as ducts where possible. Finding the stack size only serves to determine whether one or two stud spaces should be used. One space can be considered as equal to a 14x3½ stack in construction of this type and a joist space as a 14x8 duct.

There has been a lot of discussion about the use of unlined stud and panned joist spaces as return ducts. The writer has never had any difficulty due to their use in new construction where a rigid plaster base is used. The only exception to this was where the installer failed to head off above the registers and the returns pulled cold air from the attic instead of room air. There is a difference in resistance where the joist spaces are used, due to their larger capacity, but this is disregarded as the difference is in the designer's favor and the lengths are scaled off just the same as they were on the warm side of the system. Connections from stud to joist, and joist to trunk are figured the same as 90-degree elbows. The trunk sizes are arrived at in the same way as the warm air trunk, and all figures are shown on the plan and should be self-explanatory.

The continuing article will complete the layout and data sheet for our residence.

Death of James Culbert, Nashville

James Culbert, 80, partner in one of Nashville's oldest sheet metal firms (William Culbert's Sons) died Feb. 21. Funeral was conducted Feb. 22 from the home of his daughter, Mrs. Robert C. H. Mathews, on Valley Brook Road. Mr. Culbert would have been 81 on March 9. His firm occupied the same location for over sixty years. It began on Third Avenue South shortly after the Civil War. In 1895 it occupied the present building, the father having died. Mr. Culbert is survived by five daughters, his brother Edward S. Culbert and twelve grand children.

SPEED UP NATIONAL DEFENSE ORDERS with Libert Hi-Speed Shear

Save time and money—increase production—with LIBERT Hi-Speed SHEARS. One machine cuts variety of shapes without special adjustments. Cuts rings, circles, flat or formed pieces . . . plain or intricate shapes . . . in sheet metal, stainless steel, and expanded metals up to and including 10-gauge mild sheet metal.

Ask your LIBERT distributor for a demonstration or write TODAY for latest bulletins on our complete line of Hi-Speed Shears.

LIBERT MACHINE COMPANY
322 North Roosevelt Street
Green Bay, Wisconsin
"Manufacturers of Shears Since 1915"

HIGH SPEED SHEARING

The angle* that counts . . . Draft-O-Stat alone has it!

*34° This is the correct bearing angle . . . determined by engineering research . . . at which an automatic draft regulator operates at peak efficiency.

Draft-O-Stat is a precision instrument *made for life-long service,* not a product of hit-and-miss designing made to sell at a price. Typical of its exacting engineering design is the 34° angle of the stainless steel bearings . . . laboratory tested as the only angle which assures uniform draft control under all conditions . . . always. Insist on genuine Draft-O-Stats for correct, trouble-free control of drafts.

Send for the 48-page manual and learn the real truth about Draft Control.

REMEMBER There is only ONE DRAFT-O-STAT

THE HOTSTREAM HEATER CO.
8007 GRAND AVE. · CLEVELAND, O.

"Knows How To Get Low Down On Any Heating Problem"

"The Williamson Heater Company:

"We have known your Mr. Goodall for several years. When we want to get the honest-to-goodness low down on any heating problem, we like to have Fred explain it in his easy-to-understand way.

"All of our customers are well satisfied. We give them the best installation that we know how. We contact our customers regularly to help them any way we can to get real heating comfort. Our customers call up during the coldest weather to tell us how happy they are with their Williamson.

"We are expecting a good year and assure you that we will boost 'Tripl-ife' all we can."

Signed—X Y Z, . . . Illinois.

Complete information; name, address of writer of above letter furnished on request. Phone, wire or write The Williamson Heater Company.

FREE: Complete, easily understood short method for figuring air conditioning job. You can complete your figures, price job in one hour flat. Write Dept. No. 2. The Williamson Heater Company, Cincinnati, Ohio.

Complete Line . . . Quick Service

WILLIAMSON
WARM AIR FURNACES

This is our Fifty-first year

G&O RADIATION FINNED COILS

FOR HEATING AND COOLING

AVAILABLE IN A WIDE RANGE OF SIZES

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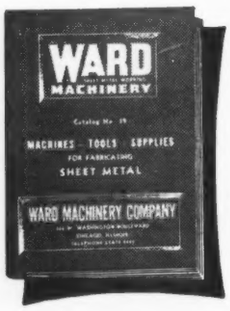
WATER COOLING COILS

THE G&O MANUFACTURING COMPANY
New Haven, Connecticut
Pioneer Manufacturers of Square Finned Tubing in the United States



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Devoted entirely to machines, tools and supplies for fabricating sheet metals exclusively. If not write us today.

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Spring Business Can Be Started Earlier
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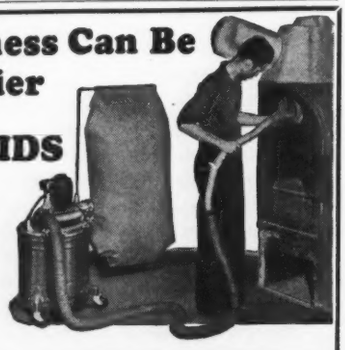
GRAND RAPIDS FURNACE CLEANER



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The "QUALITY" *Nail!*

DENISTON
TRIPLE LOCK LEAD SEAL
ROOFING NAILS

Look at it! . . . You can SEE the superiority of this nail! The lead, under the head and down the shank, plugs the hole around the nail with lead to form a weatherproof seal . . . the "bump" triple-locks nail, lead and sheet solidly together . . . when the nail is driven through sheet metal roofing, the drive screw shank gives greater holding power than any other nail. No loosened roofing, no leakage. Insure QUALITY roofing jobs with Deniston QUALITY Nails. Full details and prices, with samples and demonstrator blocks, FREE.

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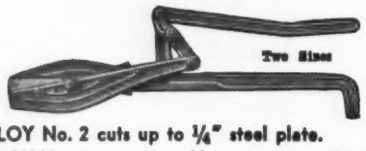
4856 SO. WESTERN AVE., CHICAGO

PORTABLE SHEARS
ALL-ALLOY



ALL-ALLOY No. 2 cuts up to ¼" steel plate.
ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.
Special blades may be had for shearing stainless steel.
FULLY GUARANTEED
BREMIL MFG. CO. Erie, Pa.

Arc Welding A Dehydrator

(*Continued from page* 77)

extra heavy pipe in which machined studs, that served as journals for the ball bearings, were inserted.

In the layout of the more complicated duct sections, paper patterns were cut out directly from the computed data that were used to mark out the sides of the ducts: with the simpler sections, a development sheet was plotted. Where the edges of ducts were to be welded, a projection of ⅛-inch was allowed, that when bent at 45 degrees, matched the adjacent edge similarly bent and formed a right-angled corner. These edges were held together with pliers and "tack" welded in position, after which the edge joint was completed. Where two sections of flue were joined, the ⅛-inch allowances at the ends were bent at 90 degrees and edge welded in like manner. If the four corners of a quadrilateral side of a duct were not in the same plane (which would create a warped surface) the side would be calculated as two triangles and a bend on the line common to the two triangles would compensate for the warp.

Welding Cheaper Than Riveting

If riveted and bolted construction were used in this installation, the cost of the adsorber alone would have been increased by at least $300, due not only to the requirements of heavier material and more accurate fitting, but to the added cost of the air-tight gaskets and the necessary testing thereof.

If the usual flue construction known as "Jersey Lock" were used for the duct work, the problem of leakage would have presented a further difficulty. A recent installation of such flues in a first class air-conditioning job, within three months has developed numerous smudges on the newly painted surfaces indicating decided leaks in the duct system. Such leakage would have been too objectionable and wasteful for our dehydrator, and would be entirely unsuited for oxygen chambers in hospitals where rigid control of oxygen content is essential.

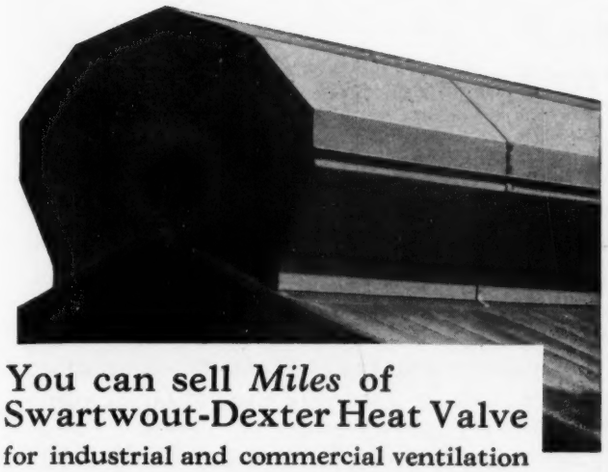
◆

Automatic Controls

(*Continued from page* 51)

switch is eliminated, the installer should realize that the action is equivalent to tying down a safety valve on a steam boiler. Automatic controls are a vital necessity for a forced-air heating system and should not be skimped.

We did not get around to system No. 2 this time, so we shall discuss it at our next session.



You can sell *Miles* of Swartwout-Dexter Heat Valve

for industrial and commercial ventilation

Give your customers more ventilating opening per dollar and a neat-appearing job they'll be proud of, and you can sell *miles* of Swartwout-Dexter Heat Valve. It's the original, scientifically designed ridge ventilator. Unusually low air travel friction, high efficiency. High quality construction—comes in 10 foot sections, ready for you to install. Full engineering instructions furnished. Write today for details, prices, and discounts.

THE SWARTWOUT COMPANY
18615 Euclid Avenue Cleveland, Ohio

Swartwout
VENTILATION SPECIALISTS

QUALITY EQUIPMENT-- FROM HESS-- COSTS LESS

DEALERS---Write for our New 1941 Portfolio

By selling — repairing, modernizing or replacements, needed by owners of a majority of heating plants now in use.

HESS BLOWER FILTER UNITS
HESS WELDED STEEL FURNACES
HESS AUTOMATIC OIL BURNERS
HESS AUTOMATIC COAL STOKERS

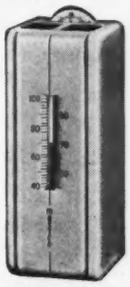
ARE GREATEST VALUES
AT LOWEST PRICES

The Hess line is complete for every dealer requirement, distinctively different and more saleable. Financing plan and territory plan—helps Hess dealers.

WRITE FOR DEALER PORTFOLIO
HESS WARMING & VENTILATING CO.
1211-27 S. WESTERN AVE. Founded 1873
CHICAGO, ILLINOIS

RUGGED CONSTRUCTION SIMPLE OPERATION

Those are the features that assure the trouble-free operation and long life of this regulator. For you, this means freedom from service calls and a friendly feeling on the part of your customers . . . when you install the



MASTER

HEAT REGULATOR TYPE A-23

This positive, snap action regulator operates on a differential of only ½ degree. Accurate, dependable, low cost, it will outlast the heating plant itself. Operates quietly, surely, and safely — to the complete satisfaction of the most exacting user. Write us today for bulletin giving complete information on the Master line.

Makers of Dependable Regulators for 25 Years

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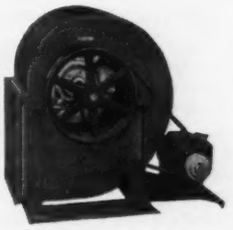

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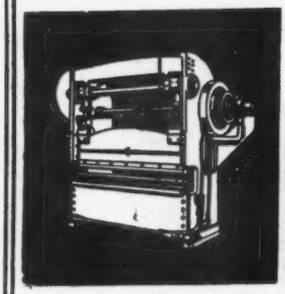

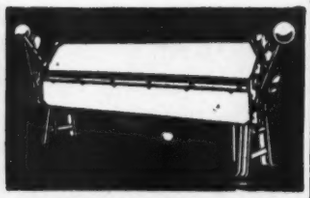

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Steel Brakes—Presses—Shears
DREIS & KRUMP MFG. CO.
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Air "Avidity"

(*Continued from page 62*)

of saturation. For instance, at 70° and 35% saturation (left hand column) each pound of air will hold 39 grains of water vapor. At 100% saturation it holds 110.5 grains. Subtracting the grains of water vapor contained from those that each pound of air can contain, we get 71.5 grains of additional moisture that the air can hold. This is its moisture avidity at 70° and 35% saturation.

The mistake is frequently made of taking readings of the relative humidity in different rooms to determine how evenly the water vapor is distributed. The correct way to determine this is to obtain readings of both air temperature and relative humidity. When the water vapor is equally distributed it will contain an equal number of grains per pound at the various air temperatures. Use Table II to find the water vapor content of the air at the given temperatures and relative humidity. For instance, assume room temperatures of 65°, 70° and 75° with 35% relative humidity in the 70° room, both readings taken at the same level and vicinity. Opposite 35% in the left hand column of Table I and in the 70° column, we find water vapor content of 39 grains. At 65° and 39 grains, the relative humidity will be slightly above 40%. At 75° and 39 grains the relative humidity will be 30%. Here again is illustrated how deceptive the term "relative humidity" is and that it must not be taken as the sole and exclusive index of humidity.

Be sure to understand clearly that to find how much water vapor the air contains, refer to the scale of relative humidity or saturation per cents in the *left hand* column of Table II. To find how much *more* water vapor the air can hold be sure to refer to the saturation per cents in the *right hand* column.

How to Use "Avidity" Data

Reference to Chart I will help to give you a clear picture of what moisture avidity is. The distance from the base line to the 100% saturation line shows how many grains of water vapor each pound of air contains at each temperature. At a distance of 72 grains below the saturation line is the "Health Line." The number of grains of water vapor absorbed by each pound of air and the per cent of saturation or relative humidity that this health line represents is marked for air temperatures ranging from 65° to 90°. These per cents of saturation represent equal moisture avidity or drying capacity at the temperatures given. Note the wide variation in per cent of saturation to give equal moisture avidity of 72 grains per pound of air.

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The key to business success is, in a large number of cases, customer recommendation. You'll find that a good furnace job that performs season after season with little or no attention, and giving top performance all the way will be one of your best assets.

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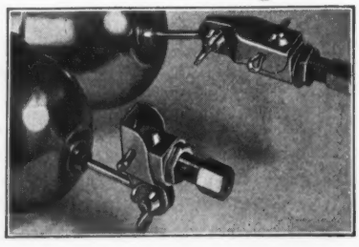

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FRESH AIR PROVIDERS SINCE 1877

The curve called "Health Line" in the chart gives comparisons showing combinations of air temperature and per cent of saturation which give the same moisture avidity as is given by air at 70° and 35% relative humidity. These combinations give breathing comfort to most people, subject to how humidity-sensitive they are. Some people are naturally sensitive to air humidity conditions, most others acquire humidity consciousness after they live in humidified air.

[To be continued]

◆

Overhead—Be Sure You Recover It

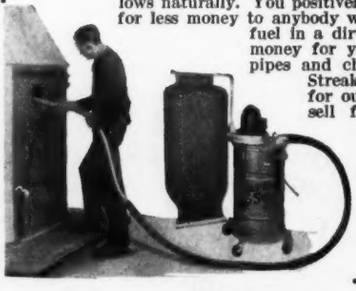
(*Continued from page* 43)

riod of less than six months are not considered adequate by most contractors.

If you want to know what your overhead really is—take your books for last year and total all your costs which you could not or did not allocate to a particular job or jobs. These costs should be your overhead costs—in other words what it cost you to run your business and do the volume you did. If you choose to apply overhead on productive labor, total up all the money you paid out for labor. If your labor cost for the year

Your Real Bread and Butter Is In Cleaning Furnaces

After all, your big bite is servicing. Your selling follows naturally. You positively can guarantee more heat for less money to anybody who is burning any kind of fuel in a dirty furnace. And you make money for yourself by cleaning plants, pipes and chimneys with a Super Red Streak Furnace Cleaner. Write for our free book telling how to sell furnace cleanings in your town. Ask for your free trial of Super.



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equals the overhead cost for the year, your overhead percentage on productive labor is 100 per cent. If otherwise, it will be a percentage you can use this year.

Overhead Should Follow Volume

If your business is seasonal or subject to rapid change in volume—break down your direct labor into monthly items; break your overhead, also, into twelve monthly items. Then as 1941 goes along look each month to see—first, that your selling volume month by month equals 1940; second, that your labor costs also keep in line; third, that your overhead costs are not increasing or decreasing.

If all three costs remain comparable with last year you can feel pretty sure that if "you get your price" you will make a profit. If you do more work this year and your overhead remains the same as last year you are making more profit and you can reduce your overhead percentage if you need still more work. If your sales volume falls off and your overhead remains the same, you are losing money and you must increase your overhead percentage to get a profit.

Sounds simple—but good cost recording requires some time, some intelligence, some courage to turn down unprofitable jobs—but pays in the end.

Be PROUD of your WORKMANSHIP and make MONEY too!

SMITH'S CLEAT BENDER will make PERFECT Drive Edges on the ends of square pipe, and make PERFECT Cleats to join them together. —See your Dealer, or write—

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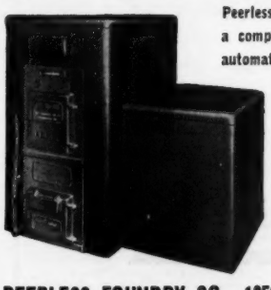

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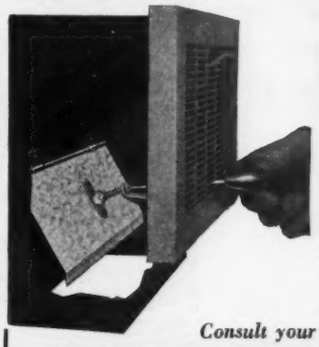

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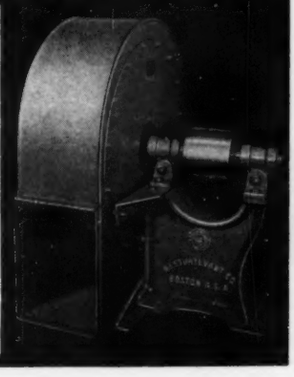

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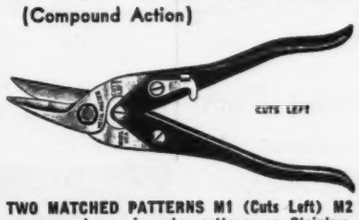

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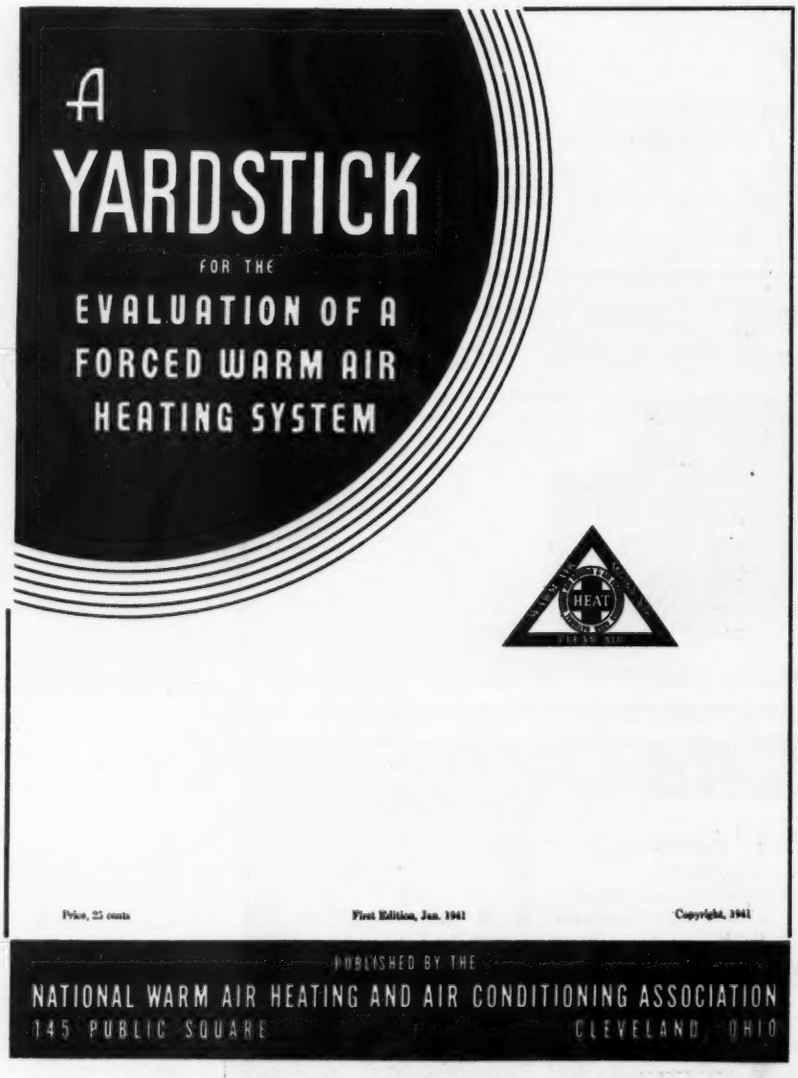

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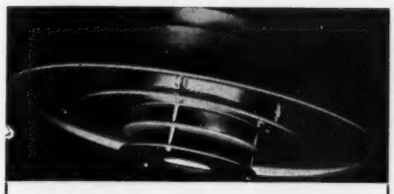

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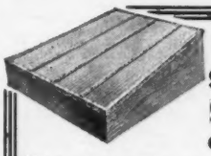

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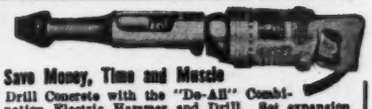

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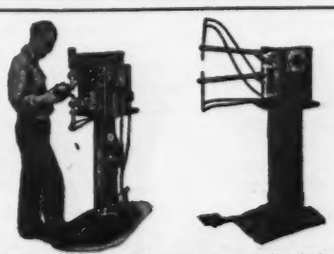

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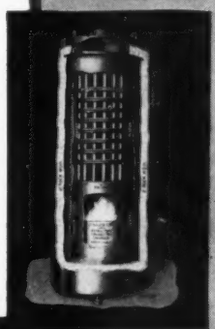

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